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WILLIAM SILVERINGS

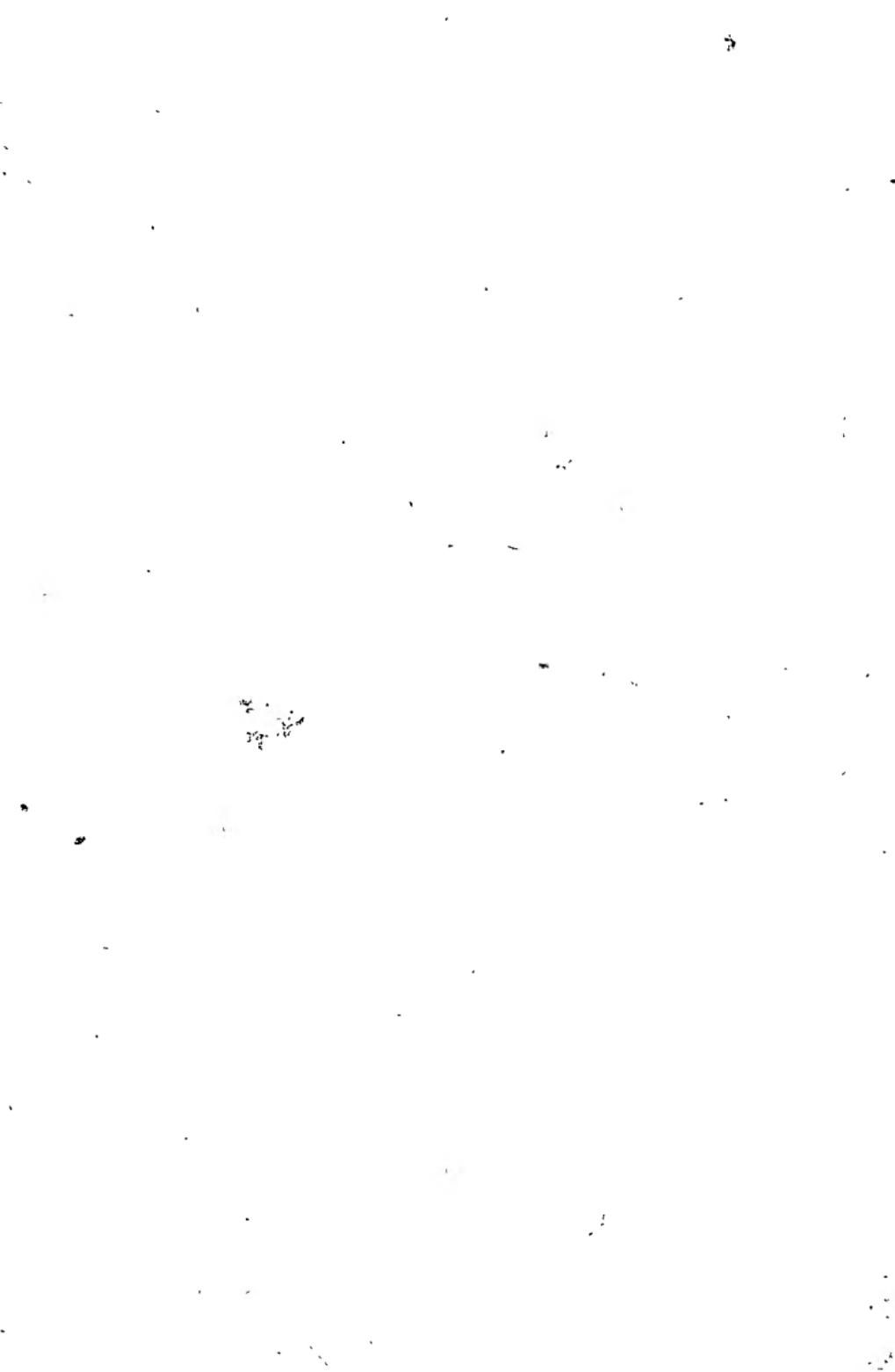
SURRENDER



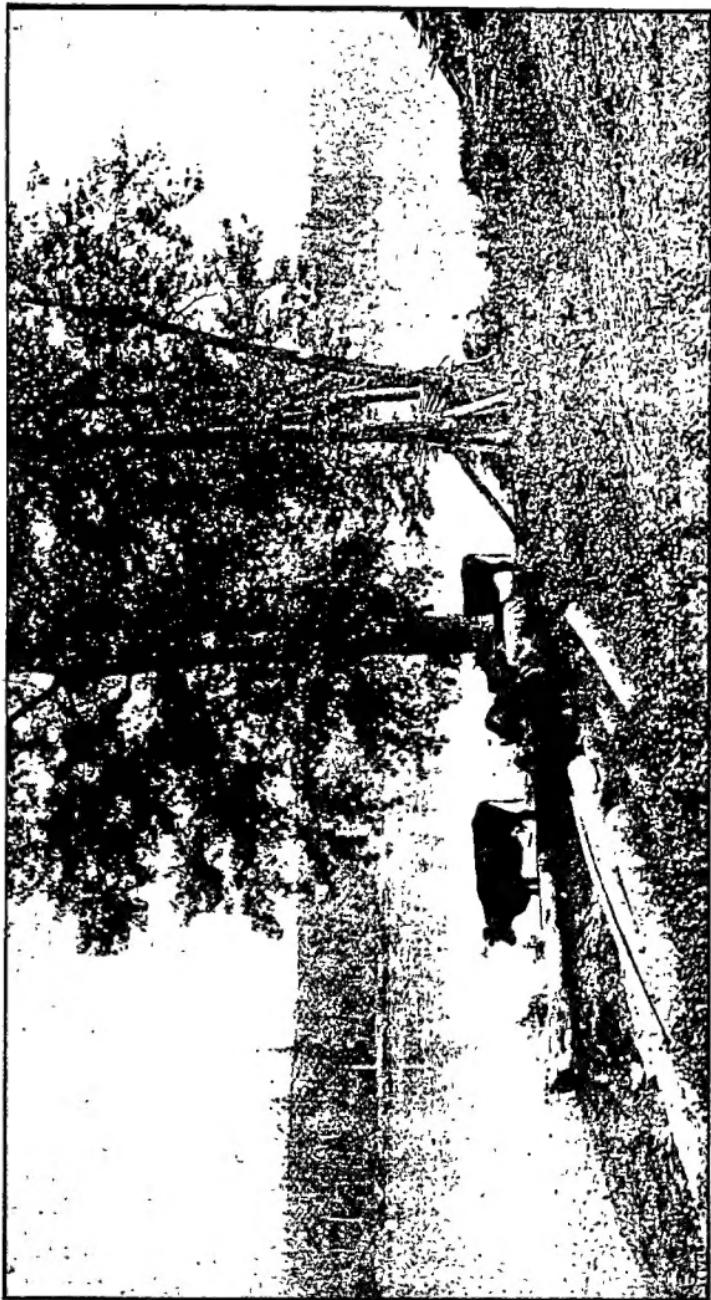
A
STORY
OF
WESTERN
EXPERIEN-
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TWENTIETH
THOUSAND

WINNIPEG
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SHADE.
(A Hot Summer Day near Fort Saskatchewan.)





WILLIAM SILVERING'S SURRENDER

A STORY OF
WESTERN EXPERIENCES.

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Forestry Association*



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WILLIAM SILVERING'S SURRENDER

CHAPTER I.

WILLIAM SILVERING'S LESSON.

Farmer William Silvering was the oldest settler in Bowerbank settlement in Southern Manitoba. He was fond of telling how he had left "the railway at Emerson and driven in "with horses, cattle, wagons, wife and children"—and he always put them in this order—the seventy miles or more that brought him to the rolling prairie at Bowerbank. He was from Ontario, and there from the County of Norfolk on Lake Erie shore.

His grandfather, he delighted to relate, was a U. E. Loyalist, who came from Virginia after the Revolutionary war, followed the "blaze" through the woods with his belongings on his back, and took up his land as a loyal British subject in "glorious old Norfolk." William's father was accordingly born in the wilds of Upper Canada, and it was the boast of the family that they had cleared a heavy bush farm, every acre of it themselves. Old grandfather Silvering was not a broad-minded man—in fact he said he had little use for "book-larnin'," and so William's father had received little education.

But the Silverings were a most honest and respectable family. Though William's father did at times murder the English language, yet he was a good neighbor—and he was a reputable citizen, if not a very enterprising or intelligent farmer. When so many Ontario people were seized by the Manitoba fever in the later seventies, William Silvering, to the

surprise of all his neighbors, sold out and went away to the Northwest to find himself with "horses, cattle, wagons, wife and children" the pioneer of Bowerbank.

It was Christmas Eve of the closing year of the century, and William was sitting beside the stove—he didn't believe in these new-fangled furnaces the farmers are now getting—and was waiting the arrival of his stalwart neighbor, James Livingston, who had promised to come over and have a chat with the pioneer.

Livingston was a young farmer who had some years before come from the Ontario counties of "Huron and Bruce"—these counties are always associated—though James had come from the latter. He was a Scottish Canadian and had brought a little money with him to Manitoba. The best farmer in Bowerbank, he was well educated and responsible, the Reeve of the municipality, and a rising man, it was said, for parliamentary honors. The only charge that could be brought against him was that he was from "Huron and Bruce." He always parried this blow by telling about his old Highland aunt from Oxford County, Ontario, who had spent a winter with him in Bowerbank, and who declared that she did not know what the people here meant by saying that "It was forty degrees below Zorra." Livingston was a pushing, enterprising fellow, was a great reader, and went in for stock raising and dairying as well as wheat growing. It was the general opinion among the farmers that he was "doing well." James on this evening was true to his promise and at the appointed time arrived at the Silvering homestead.

The two men, though not much alike, were great friends, and William while professing to differ in regard to all the "brand new ideas," which he seemed to think it his duty to oppose, yet leaned much on Livingston's judgment—just as ignorance and weak-

ness always do on superior intelligence." After they had settled down to become communicative, Silvering said, "What's all this fuss, they're makin' about tree-plantin'? meetins, and speeches, and talk, and resolutions, I can't see what its about.. There was nothing of this sort down in old Norfolk. The only excitement we had there was a political fight or a protracted meetin'." Why, I planted some trees here when I come, but they all died. I think it was intended these prairies should be bare, and I'm not goin' to fight agin Providence."

"Oh, you're all wrong on that, Silvering," quietly replied Livingston. "You can grow trees in Manitoba, and I have grown them. You and I generally agree pretty well on religious maters, William., but you're astray about Providence this time. The eye of Divinity delights in trees. See when men make a black ruin, or an ugly brickyard, or a crumbling stone wall, in a few years nature has it covered in with grass or creepers, or flowering plants, or little shrubs, and hides all its ugliness. I believe these prairies are here for us to beautify and to improve—and we're to blame if we don't do it."

"Well, maybe so, James, but trees are pretty hard to grow."

"Why, Silvering, all precious things are hard to get ; think of the value of a tree. I was reading the other day: "The tree, as it flourishes and spreads its branches, or gives its leafy shade, is the symbol of the upright and kind hearted man. Its growth is the pledge of increasing usefulness. It is the type of the most heavenly organization known among men; as under its leaves the birds nestle in safety."

"Oh, James, you always talk me down. You're too much for me!"

"William, it's not my talk. I have a way of cutting out from the newspapers short scraps that are

good, and I have one in my pocketbook, by that great Boston writer, Oliver Wendell Holmes: "I have written many verses, but the best poems I have produced are the trees I planted on the hillside which overlooks the sinuous Housatonic River."

"Is not that fine, now Silvering?"

Before William could gather himself together to reply, both were interrupted by the jingle of sleigh-bells as they heard some one arriving outside. William was quick to hear the sleigh bells, though Livingston always believed that Silvering was just dropping off to sleep, as he was in the habit of doing on Sunday in church, when the sermon was long or dry.

"Oh, that's the minister," said Silvering; "he said he would likely call in on his way down to the other settlement and stay all night with us."

In, almost at once, came the minister, Rev. Robert Brown. Silvering's good wife quickly met him in the hall, relieved him of his great raccoon overcoat, fur cap and gloves, and ushered him into the presence of her husband and his friend. The minister was not a stranger there. The neighbors had a joke that when the minister arrived at Silvering's all of Mrs. Silvering's large flock of poultry—at least the older and wiser got under the granary and hid themselves till he was gone, knowing that some of them would have to fall before the executioner's axe for dinner the following day. It was noted, however, that Miss Louie, the flower of the Silvering family, did not thus betake herself to a hiding place when the handsome bachelor minister arrived.

Supper was soon served for the new arrival, and he rejoined the company of the debaters. Young Minister Brown who had lived in Bowerbank for five or six years was about thirty-five. He was well liked. The people said he was a friendly man, attended to

his own business, and all admitted that he knew a good many things.

The fact was Minister Brown had taken a course in the Guelph Agricultural College and had afterwards gone to the University to study for the ministry. Preliminaries all over, the discussion turned upon the new effort being made to have tree planting become general throughout the Canadian West.

"Well, minister," said Silvering, "are you one of them 'Arbiculters' or whatever you call 'em?"

"Oh, yes," modestly replied Mr. Brown, "I believe they will be the salvation of the prairie country."

"Well, Sir, how do you make that out?" said the farmer.

This was the minister's opportunity and he launched forth: "See what a tree is and does. A tree is a great and beautiful organism placed in Nature with a purpose. By its root it is anchored to the ground and made secure in its standing place. Here it may grow and feed; much of its food, it is true, is from the air, but here also it receives nourishment from the roots. As Grant Allen has said, "The root drinks water. The hairs and tips of the root absorb moisture from the soil, and this water circulates freely as sap through the entire plant." Just as in the human body the blood in its course passes to the lungs to be purified and made fit for use, so in the tree the sap is carried through its channels to the leaves; and these allowing it to come into contact with the air serve as lungs to make it ready for the refreshment and building up of the tree.

The way in which this is done is very wonderful. The tip of the root is the part of the plant which exercises the greatest discrimination and ingenuity, so much so, that Darwin likened it to the brain of animals. For it goes feeling its way underground, touching here, recoiling there, insinuating little fingers

among pebbles and crannies, and trying its best by endless offshoots to fix the plant with perfect security.

These little fibres or roots are very soft and will take in the water from the earth, but we must wait to see how the tree does it."

This description of the minister rather stunned Farmer Silvering. He had nothing to say. Miss Louie, who with her mother, had joined the company, with admiring gaze drank in the words of wisdom.

Mr. Brown getting rather warmed up to his work, proceeded : "The tree begins its work far up at the leaves. The outer layer of the green leaf, as we find under the microscope, is made up of clear, flat cells, full of water, and the green stuff lies below this. See then what happens. The sun heats up the leaf and a little moisture goes off as steaming vapor, and this leaves an empty space. Now, just as you see the water rise in a pump, when the handle is worked to make a vacuum, so the particles of water rush in to fill that vacancy, and so on up the twig, and from the branches, then from the trunk, and even from the root comes up the watery sap. This extends nearly to the end of the root which is open and porous so that when the last cells are vacant the water presses in from the soil on the outside, and so up and up the sap goes, just as if it had the power itself to climb.

In this way the sap, made up of water containing salts and other substances from the earth, may be said to rise leaving its contents on the way to build up the tree, and then it in part as finest vapor escapes from the leaf pores and finds its way into the air. The leaves are thus the mouths of the plant, for in Spring when the leaves are not full-grown the sap cannot rise, but gorges the stem so that when we pierce it it bleeds ; so in the summer when the leaves are broad and green and fresh, the sap circulates

more freely and the evaporation from the leaves of the tree is greatest."

William Silvering had been sitting with puzzled eye, as the minister proceeded, but the word "evaporation" made it impossible to remain silent any longer. "Evaporation, minister, means givin' off gas doesn't it? Well, don't men do a good deal of that at times?"

"Oh! hold on, Silvering," struck in Livingston, "that's too bad. Mr. Brown is right; you cannot understand the use of trees until you know what a tree is. I move that Mr. Brown finish his explanation," and the matron and her loving daughter bowed their full assent.

Though the minister would fain have stopped, yet he wished to finish his statement. He said, "But this is not all. When we examine the leaves carefully with a microscope of some power it is found that besides the small pores spoken of there is a special arrangement of a very wonderful kind, of a large number of rounded openings called 'stomata,' or mouths. By these much more moisture is allowed to escape. In the white lily there are from 20,000 to 60,000 stomata in a single square inch on the lower side of the leaf, and perhaps 3,000 on the upper surface. These mouths are really self-acting valves. They consist of two narrow cells lying alongside each other. When these are moistened they expand, become moon-like and leave an opening between them. By this the moisture escapes. When the cells dry, they straighten and close, allowing no escape of vapor. Thus when there is too much sap in the leaf they open and allow an escape of water as vapor; when too little they close and retain it."

The thick-leaved cactus, which is found in a few places in Manitoba, also largely in some localities farther west, and is fitted for dry regions, has stom-

ata, but they do not act at all in the dry season of the year. Water plants have no stomata.

Thus we see that the greater the heat and the brighter the sun, if the plant is well provided with moisture, the greater is the evaporation. It is marvellous in our temperate zone, to find the enormous escape of moisture in our plants and trees. A sunflower, three and a half feet high, which has with its wide leaves as much surface as a platform 25 yards square, gives off a pound and a half of water in 12 hours ; and a seedling apple tree with a surface of leaf as large as a centre table, 3 feet 4 inches square, evaporates nine or ten ounces a day, or about the amount that a man would perspire in that time.

Silvering, not seeing the bearing of Minister Brown's illustrations, was steadily relapsing into a peaceful slumber.

"We see then," continued the speaker, "that the tree is really a pumping apparatus by which the supply of water coming from the earth passes up into the higher air. The tree brings up the water as it is needed ; it checks the waste of water by which if there were no trees, the moisture would all be carried from the treeless plain by the heated air and transported in clouds to the distant sea ; it is indeed a mysterious workshop which builds up a thing of beauty and also supplies the air with a requisite and timely supply of moisture.

If one tree is so useful what may be said of a plantation or a forest ! It cannot but be a powerful regulator of climate. When the warm winds would in a day or two, as we see in the case of our Chinook winds of the far west, lick up every trace of moisture from the prairie, this is prevented by the occurrence on a landscape of shrubs, and bushes, windbreaks, avenues, clumps of trees, bluffs and timber reserves. These preserve the moisture to be used by the growing herbage in the warm weather of summer and pre-

vent the droughts to which all prairie countries are at times subject.

Mr. Brown stopped suddenly and Silvering awoke to hear his last remark. He at once said, "Pre-
vent drouths!" You can't do that. Trees have no-
thing to do with that. It is the want of rain. You
arbiculterers are goin' too far. Why, we cut down
nearly all the trees in old Norfolk and I never heard
tell of it doin' any harm. Lake Erie never went
down. Bear Creek was full in spring ; of course it
got pretty low for a while in summer, but we did
not have many dry years—one in three or four—per-
haps. I suppose, minister, you got all that talk of
yourn from some book or other." The troubled ma-
tron and the blushing daughter wondered how father
could be so plain in speaking to the minister.

But Livingston was ready for his neighbor. He
remarked, "No, Silvering, you're wrong again. On-
tario is suffering from the loss of its trees. Seasons
are much drier than they used to be, and floods more
damaging. What is a forest? It is not a thing such
as the early settlers of Ontario thought it, with its
splendid sugar maples and wide spreading beech
trees—a thing simply to be destroyed or "cleared."
It makes one sad to think of the beautiful and val-
uable forests of Ontario, of precious walnut, bird's eye
maple, and white oak, cut down so ruthlessly by the
early settlers! True they needed land for cultivation,
but to-day they would give anything to get back a
portion of those forests, so ruthlessly destroyed.

I remember, as a boy, the "logging-bees" of
early days. After the settler had cut down a few
acres of trees, then he invited all his neighbors to
help him through. Fifty stalwart men with oxen or
horses met. They cut up the prostrate monarchs of
the forest into logs ; with noise and vigor they rolled
these into heaps, and then burnt them up in a great
bonfire. With laughter and shouts an untold quan-

tity of the best wood in the world was destroyed. An Ephesian burnt down the great temple of Diana to give himself fame ; the early settlers of Ontario who wasted their forests deserve no fame.

The evening of the "logging-bee" was a fitting conclusion to the day. The fires still glared on the sky ; a few grimy men still kept the piles burning ; but the feast at the settler's cabin went on with merriment and jollity, and often dissipation ; the evening passed with dancing, music and extravagant excitement. It ought to have been a funeral. It was the death of the giant trees ; it was the waste of millions of feet of priceless timber that to-day in manufactures would bring large returns ; it was removing the natural covering of the earth placed there to preserve its fertility."

"Hoigty-toigty, Livingston, go ahead. Why you're beatin' the minister." But James continued without noting the interruption.

The loss of its forests is a calamity. To-day Ontario is lamenting its loss ; it is trying to reforest its bare hills from which the streams now largely dried up took their rise : IT IS PAYING THE PENALTY FOR DEEDS OF DESTRUCTION, WHICH ALWAYS COMES. What would Manitoba not give to-day for some of the forests, which went up in smoke at the "logging-bees" of our mother province !"

And is Manitoba blameless ? Beautiful groves of splendid oak trees in Southern Manitoba, and on the Pembina Mountains have been cut and slashed in the most reckless manner by the settlers. Whole belts of timber, along Red River, on Bird's Hill, along the railway line at Tyndall, Beausejour, and Whitemouth have been blotted out. Groves of fair Poplar and good Oak south of Portage la Prairie are things of the past. The remote Moose Mountain is being denuded of its woods.

Settlers complain that they are not permitted

unlimited use of the forests in the East, and South, and West sides of Riding Mountain. The careless and thoughtless object to the policy begun on Turtle Mountain of preserving the forests. A great talker at the Forestry meeting in Winnipeg lately arose and proposed to speak in the interest of the poor settler, who is not allowed to cut down everything that his sweet will desires. This was unreasonable. It is to the interest of the farmer that the trees should be preserved. True, the settler needs wood ; but in the Forest preserves it should only be taken under permit ; it should be the fallen wood, the old and useless trees. The forest and especially its young trees ought to be preserved. It should be every intelligent farmer's aim to protect the forest as a precious thing, and to grow trees upon the prairie till it too becomes a beautiful forest."

Oh, "Woodman ! spare that tree !

"The old familiar tree

Whose glory and renown

Are spread o'er sea and land—

And would'st thou hack it down ?

As Livingston closed, the minister clapped his hands, the mother and daughter showed their approbation in their faces, while William Silvering remarked, "I seem to be in a hopeless minority in this gathering. I, don't give in ! and, James, I am like that Scottish fellow-countryman of yours who said, 'I am open to conviction, but I would like to see the man that can convince me.' I dare say I may go to the next Forestry meeting, if for nothing else than to hear the eloquent talkin' of Messrs. Brown and Livingston."

The usual farewelling and retiring to rest took place but no one had any sad regrets from the evening's discussion.

CHAPTER II: MINISTER BROWN, ARBORICULTURIST.

Nearly a month had passed and the Bowerbank Forestry Association had gathered for a meeting. Bowerbank being a thriving settlement boasted a large and commodious school house—the largest in the county. That evening it was crowded and the member for the county presided. The chief speakers of the evening were to be the Rev. Mr. Brown and Reeve Livingston. William Silvering was there to the surprise of the neighbors ; and quite according to the expectation of the neighbors, William's wife and Miss Louise were there also. Minister Brown was first called upon, and spoke as follows :—

LADIES AND GENTLEMEN :

That delightful writer, Washington Irving, says : “ There is something nobly simple and pure in a taste for the cultivation of forest trees. He who plants an oak looks forward to future ages, and plants for posterity. Nothing can be less selfish than this.”

Perhaps few of us realize how exceedingly important the presence of trees is to us. Like many other good things we value them most when they have gone.” I will point out some of their uses :

I. *The trees protect from fierce and damaging winds.* The prairie has its own peculiarities of windage. Its wide and uninterrupted expanse almost always has a breeze stirring. The movement of the long grass on the prairie before the wind in summer reminds us of the continued motion of the sea. The sultriest day with us in Summer has its zephyr, almost always cool and refreshing. Taken altogether, however, the complaint of visitors and new settlers about our prairie is that it is never quiet. “ It is always blowing,” you will hear men say..

Commencing with the Spring, at the time when the



RIVER VIEW
At Fort Saskatchewan.



farmer is all alert to get his wide fields sown with wheat and other grains, he usually sows the seed on very dry soil, before the coming of the rains which fall late in April or in May. Now in 1897 and 1900, and in other years, high winds rose that destroyed a great extent of the sown grain. In the year 1900, so strong was the wind that along the edges of the fields great drifts of pulverized soil accumulated carrying with them the grains of wheat. In some parts of Manitoba farmers sowed their fields three times in that unfortunate year. Rows of trees and shrubs would almost completely prevent this, and give shelter to the open fields. The same applies to the grain in the state of its green blade, when it is sometimes torn out by the roots by strong winds. At a still later stage the effect of wind upon the ripening grain is seen in the beaten down and lodged tangles into which the fragile stalks are thrown. Avenues, wind breaks and hedges will protect the fields.

In the Canadian West there are certain well known farm plants of the eastern provinces, which cannot now be grown. Red Clover is one of these—one of the most useful fodder plants, as well as being valuable for bee-culture. I have seen the clover growing in small strips on the south side of some sheltering bluff of poplar trees in Manitoba. This is a proof that all that the clover needs to be more common and serviceable is a line or cluster of trees to protect it.

This is true of many other plants. Professor Bessey of Nebraska University, the well known botanist, once stated in recommending that the Government should plant blocks of trees here and there over the prairie areas, that it was his belief if this were done and the prairies should become wooded, that almost all the plants of the eastern states and provinces would find their way to the west and flourish in the shelter from the north wind thus afforded.

All travellers in Manitoba are aware of the great

difference there is in cold and stormy weather between an exposed prairie road and one sheltered and comfortable through the belts of forest. The children on their way to school always seek the shelter of the "winter road," if there be such, and tree planting may enable us to protect our most exposed prairie roads.

The Western farmer in winter spends his time largely among his cattle. While conducive to health the weather is at times severe for the herds. In former days cattle following horses who broke the icy crust of snow for them, found good winter pasturage from the dried grass of the prairie. Cattle are still fond of passing a part of the coldest day in the open air. With wind-breaks and belts of trees this may be done with great profit. The cold winds are warded off and the cattle thrive in the fresh air. Thus, for man and beast alike the belt of trees affords a much-needed shelter.

2. *The trees are reservoirs of moisture.* To the southwest of Manitoba and the Northwest Territories, south of the United States boundary line, lies a barren region known as the Great American Desert. Here cactus and sage bush revel in the barren wastes. From this arid region hot winds come northward with withering effect. The herds become thirsty and excited, the crops are sometimes withered in a few hours, and human beings are parched and in distress. The ground bakes and cracks.

Stratum after stratum of air falls down to come in touch with the dry earth, soon also to be heated and dried. In this way the prairie becomes like a desert. But if there be belts of trees the shade prevents the earth becoming so hot; the foliage of the trees keeps the moisture from evaporating, and the stomata of the leaves close up and retain the watery sap. Thus the forest checks the dangerous tendency to drought found in many parts of the wide plains of

the West and if extended may prevent such a damaging drought as was seen in Manitoba in the summer of 1900.

3. *Trees make a humid climate.* Most of us know the way in which winds upon the earth's surface originate. The great expanse of sea surface at the Equator is acted on by the intense heat of the tropical sun and evaporates copiously. It is said that in the equatorial portion of the earth there is evaporated in a single year not less than sixteen feet of water over the whole surface. This in the shape of vapor is carried aloft; the cooler air from the north rushes to fill the vacancy and the heated rising air goes north as the upper currents and carries the moisture with it.

Great vapor waves of this kind constitute the clouds with which we are familiar. If the surface over which this passes is dry and hot the upper winds go on to the far north until they are chilled to rain or more commonly snow by the icebergs of the north. But if the surface is covered with trees the earth is not so greatly heated, the trees preserve a lower temperature of the upper air belt and cause the moisture of the upper air to descend in the form of rain.

The hotter the air the more moisture will it hold without sending any down as rain. Thus at a falling temperature a portion of air will not hold as much moisture as it did when the temperature was higher. For example, a cubic foot of air at 80 degrees can hold 11 grains by weight of moisture, but at 66 degrees it can hold only 7 grains. Now, when the hot wind carrying moisture from the south, passes over a wooded country, where the temperature of the forest is lower the wind is reduced in temperature. Should it fall the fourteen degrees spoken of, 4 grains of moisture in every cubic foot not being able to be retained will descend as rain. Thus the forest acts as a cooling agent to produce rain.

Again, in forming dew the trees of the forest play an important part. Dew as is well known is produced by the grassy surface of the earth giving off its heat and becoming in the evening cooler than the air above it. The constant evaporation from the forest also makes it cooler, while the shade preserves a lower temperature. Now when a cubic foot of air has say 90 degrees of temperature, and it is cooled down to 75 degrees, as the dewpoint, dew will be deposited upon the cooling surface of the grass and leaves. Should the night be cloudy the heat is not given off from the earth, ~~but~~ is driven back by the clouds and there will be no dew. When the sky is clear the heat is carried away, the forest and other surfaces cool down and the dew is formed. It is thus plain that trees are ~~very~~ important agents in preserving to a country a humid climate.

4. *Trees preserve the springs and rivers.* All people have accounted springs of water as precious. The camel and his Arab driver on the desert both pant for the palm trees in the distance that indicate a green oasis-in the desert, which proves the existence of springs of water. These springs are simply the accumulation of the waters brought by rainfall in some bed of porous earth that will allow it to gather there. Where the trees are, are the springs, and where the springs are the trees can grow. The trees have their main roots, and especially their fibrous delicate rootlets, immersed in the springs. When the springs become filled and the earth of the highland cannot contain the water, some of it runs off and forms, first, the rivulet or brook, then the brooks gather into the river and the brimming river flows through the lower land to refresh it. How greatly we appreciate pure water for man and beast !

It is now plain that to have a river the fountain or source must be protected.

Western Manitoba and East Assiniboia are

largely dependent on the water system of the Assiniboine River. This river has its rise in the Riding Mountains, a cluster of high hills, in the northern part of the province. Several streams run from the springs of this height of land of Riding and Duck Mountains. The main branches—the Shell River, Little Saskatchewan, and the Birdtail, flow from the south side, and from the north side come the White Mud, Big Grass, Ochre, Dauphin, Vermilion and Valley rivers. Turtle Mountain also, in Southern Manitoba, has a network of streams running from it watering the country along the chain of lakes—White-water, Pelican, Rock Lake, and Swan Lake. Moose Mountain, likewise has flowing from it several streams. Now these highlands are well timbered, but are in imminent danger of being deforested. Settlement is naturally threatening these important forest tracts, by making fires more common, and by cutting the wood for farm and milling purposes.

Cut down the trees and the high hills will become dry and barren. The centres of which we have spoken will have great freshets in spring as the snows are melted from the bare hill sides, and will be small by midsummer. All its feeders cut off, the Assiniboine river will be so diminished that it will dry up every season at Winnipeg—a thing of most serious moment.

The Government, farmers, and citizens of Winnipeg, should all resist selfish agitations to have this timber region opened up for settlement, or to allow its wood to be used and so lavishly that the fertile district of Manitoba, would tend to become a barren region.

6. *Trees regulate the flow of waters.* The prevalence of floods in some parts of America is a very serious matter. When the rivers are sealed up in winter to a great depth, and the spring sets in so quickly as it does in Western Canada, it ought to be

a subject for careful discussion and wise action. The more will this be important that the prairie rivers have as a rule low banks and may easily overflow.

A study of different seasons will show very clearly what the causes of danger are. We have seen some spring times that were slow and backward. The first days of sunshine and mildness were followed by northwest winds and the melting of the snows was checked. Then would come a few days of milder weather and a thaw would set in, soon to be followed by another cold snap. In this gradual way the snows disappeared, the ice melted and there was no fear of high water.

In other seasons the spring was later perhaps and then came on with continuous warm weather, the season passing as is said from winter suddenly into summer. Before the ice could yield to the sun's rays, the melted snows rushed in from the bare, open prairies. The water rose above the ice, and its temperature was such as to interrupt the melting for a time. Such a season has features of danger in it.

Imagine what it would be if all the sources of the rivers in Riding and Duck Mountains, in Turtle Mountain, and Moose Mountain were cleared of forest. As it is now the snow and ice of the sources of these rivers are kept late in melting; the springs are frozen till well on in May and June. This prevents a vast body of water from seeking a channel by the rivers, which are at this season gorged with the inflow from the prairies. In the case of these sources being denuded of their forest protection the melting snow and ice would pass away in a few weeks in April or May and would be a constant source of danger to the country.

But not only the prevention of floods, but also the steady supply of water for the growing crops is of greatest importance. If the influence of forests can be felt on the rivers and creeks, till well on in

July there is thus produced a practical irrigating agency. The evaporation from the streams and ground moistened by them will bring rain and be of immense value to the country. Such are some of the general advantages of trees. They are a means of communication, a harmonizing medium between the forces of the air and the forces of the soil. "He who plants a tree plants a joy—plants peace."

CHAPTER III.

FARMER LIVINGSTON SPEAKS.

Great applause followed the clear and convincing address of Rev. Mr. Brown, and the Chairman called at once on Reeve Livingston, his political opponent, though a warm friend. Livingston said :

LADIES AND GENTLEMEN :

In an agricultural country like the Canadian West, whatever benefits the country in general is of service to the farmer. But the farmer has special interests which the influence of trees will largely affect. It is not implied that trees can turn an inhospitable climate into a genial one. The growth of trees of value in Labrador, or the shores of Hudson Bay, or on the Lower Mackenzie River is an impossibility. The vegetation beyond 60 degrees N. will be, at any rate in the centre of a continent poor and valueless.

But in a country where as in Manitoba and the Northwest Territories, elm, oak, maple, and other such trees grow to advantage in sheltered spots, on ridges and elevations, and on the banks of rivers, it is safe to assert that they may be grown till the prairie is well covered by them, and that this will be of immense value to the farmer.

1. The presence of trees tends to prevent Summer frosts. It is a principle, pretty generally admitted, that the best specimens of cereals—such as wheat, oats, and barley—are obtained from near the northern limit of production. Wheat of a good sample, other things being equal, will produce a yield better in quantity and quality in Manitoba than can be obtained in Kentucky. Barley of the highest quality grows luxuriantly on the Peace River.

Now, while this is true, yet it is plain to be seen that just as an unexpected and sudden frost may kill the orange blossoms in Florida or California, so there is some danger of summer frosts doing damage especially to the wheat when it is in August in the flowering or milk stage in Manitoba or the Territories.

For several years past (1901) the seasons have been most favorable, and no grain sown in proper time has suffered from frost even on to 10th September. But should what has been seen at times be repeated it is a serious matter to the farmer. It is true that in the Canadian West, taking the length of days and the quantity of sunshine, there is as much sunlight as in any eastern province of Canada. There may be, however, a cycle of years in which frost may be expected in August just as another cycle of years in which no frost comes until well on in September when the crops are ripe and cut.

Frost as even a child knows arises from the heat being given off from the earth into the air. The earth's surface then cooling down chills the moisture in the air into dew, and the heat being still given off the temperature falls to 32 degrees Fahrenheit, or below. At this stage the drop of dew is changed to ice, and should it be lying at the foot of a grain of wheat in the milky stage freezes the pulpy kernel. When the sun rises and thaws this out the decay of the

grain sets in, and both odor and appearance show the kernel to be injured, and if badly frozen destroyed.

How do the summer frosts come? In August when the heat of summer is somewhat diminishing the sky sometimes turns cloudy and a cold rain may follow; after this the wind turning to the northwest the weather becomes cold. The wind blowing all day from this direction over the prairie fields takes up much heat from the soil and carries it southward; a second day makes the matter worse; so that on the third day a large quantity of heat being taken away the temperature may be reduced to say 45 degrees, that is 13 degrees above freezing. The weather now clearing up the clouds pass away, and leave a still, clear evening, with the thermometer going down slightly, each hour, as the earth radiates its heat. By two or three o'clock in the morning the temperature may be down very near 32 degrees—the danger line. Often by that time the heat of the sun before sunrise is felt slightly, and the thermometer begins to rise—the danger is over. But sometimes it may sink farther to 30 degrees or a few degrees lower. Great damage will then be done. So near is the temperature at times to the danger, that what might seem to be freaks occur. Sometimes the sheltered side of the wood or bluff seems to be struck by the frost, sometimes the valley is taken, when the ridge escapes. It is impossible to estimate all the conditions in any given place. But in every case the frost has been caused by the heat leaving the ground and being carried off to higher strata of air by radiation or to distant localities by wind. As a rule such conditions happen only once or twice in August, and in many years do not come at all. How does the existence of trees affect this?

(a) Forests and plantations will check the wind that precedes the damaging frost and prevent the loss of heat in this way. Except in very high or exposed places the amount of frost is very small, only

a few degrees—at a given point. So that the prevention of such winds would in five cases out of six result in there being no frost. The shelter from the northwest in such places as the southeast slope of Pembina Mountains and the south side of Moose Mountain, has resulted in generally preserving those districts from frost.

(b) The other loss of heat results from the clearing of the sky after rain and the soil losing its heat by radiation into the upper air. Here, too, trees have a beneficial effect. The tree, as we have seen, shades the ground and prevents the heat leaving it suddenly and going upward. The shade of a dense forest indeed acts in the same way as a sky full of clouds which prevents radiation of heat and saves from frost. That this is the right theory of the matter may be seen from the fact that large bodies of waters, such as Lake Manitoba, retain the heat longer than the cooling land at night. The Portage la Prairie plains have thus been saved from frost on several occasions.

I do not say that even the general planting of trees is an absolute protection from frost; but I am of opinion that the Summer frost would be a rarity in the Canadian West if we had the country well protected by general tree planting, and had as well a complete system of drainage such as the construction of railways and the building of roads by municipalities is accomplishing.

And not only will the growth of forests tend to keep a more average temperature in summer, but it will make a more equable winter climate. The absence of high winds when trees are grown in sufficient numbers as shelter, and the prevention of the radiation of the earth's heat especially by evergreen trees is so considerable, that along with the increasing area of land being cultivated, and the consequent retention of heat in the soil, there is ground for believing that the wide prevalence of blocks of trees in

the Canadian West will moderate the winter climate.

2. *Trees hinder hail formation.* One of the most destructive agencies in the growing time of summer is the hailstorm. There is much question as to its origin, but there is no doubt about its harmful and destructive nature. One theory which seems to be gaining ground, though it is hard to see that it meets the case, is that electricity, which is always manifested in severe lightning discharges, has to do with its formation. Certainly electric discharges accompany the hailstorm, but which is cause and which effect remains to be seen.

A more common explanation of hail is that it arises from upward currents of air which form a sort of whirlwind. It is said that in the front of the hail cloud there is a violent, whirling motion, and that the hail cloud being of two different temperatures the hailstones form by being alternately hurled from one to the other. During each summer, hailstorms occur on the prairies, and certainly some districts are more subject to them than others. A district of Manitoba parallel to one of the high ridges or so-called mountains, is said to suffer from hail. So serious are the hailstorms that Insurance Societies have been formed to recompense for the losses caused by them.

From our standpoint, however, it makes little matter, which theory, whether of electricity or whirlwind, be taken. It is well known that treeless districts are far more subject to hailstorms than others.

The trees act as a conductor and cause a steady flow of moisture upward, tending to make it of even temperature. The forest in this view will reduce hailstorms. If the more probable theory of hot and cool currents, and their producing whirlwinds, be taken, it is evident that the block of trees will prevent this. So far as observed the whirlwinds on the prairies often follow river valleys, or are parallel to chains of hills. Both of these are more or less covered with trees.

Thus by the unequal radiation of heat from the timber belt and from the heated prairie two columns—the one cool, the other hot, are produced. As these two meet, motion of a whirling kind results from the endeavor to restore an equilibrium between the two. Thus the hail storm is caused.

Let the prairies be planted with trees, and the radiation of heat over the country thus become more regular, and the chances of hailstorms originating will be reduced to a minimum.

3. *Trees attract birds—the farmer's friends.* It is a wrong impression that many hasty travellers over the prairie have gained that animal—including bird—life is scarce. The ducks and geese are taken to be migratory, the cranes few, a few coveys of prairie chicken are seen and the presumption then is that our birds are rare. But take a stand in Summer in a grove of Manitoba Ash-leaved Maples, and the whole place will be vocal with songs of birds. The reason birds are not found everywhere is because there is a scarcity of trees. Select a wheat field and beside it will be found toward harvest hundreds of black birds. Cultivation of the land, and tree planting have but to be extended and birds will largely increase. And what is the value of birds? In Manitoba bluffs and timber belts will be found large numbers of insectivorous birds of many species. These are invaluable for the preservation of the country from insect pests. Manitoba has not been greatly afflicted with insect enemies thus far; but the intimate connection with our eastern provinces, where these unfortunately abound, warns us that we may expect them. The black bird may take a little from the wheat field, but he wages war on moths and butterflies, whose grubs destroy the trees and gardens. To increase the birds increase the trees where they may be sheltered. And not only so, but the birds of prey have their useful function and they need the shelter and protection of

the trees to escape the gun of the fowler, who follows them with senseless persistence.

Hawks and owls are not the foes of the farmer, but his friends. Occasionally birds of one or two species may seize a chicken or other barnyard fowl, but in a hundred cases they will repay it by ridding the fields of mice and gophers, which are very destructive to the crops. The stomachs of certain birds of prey have been examined and the result shows that they destroy much vermin, and should be spared by the farmer. Plant trees and invite the birds of the air to tenant them.

4. *Trees give shade and protection.* In the sultry days of summer cattle and horses suffer greatly from the fierce glare of the sun, and fall off in flesh. Every farmer should have a few trees left in each field to protect his flocks and herds from the sun. The air of comfort with which the patient cattle, after feeding for a time, find their way to the protection of the spreading elm or maple is a proof of the value of the shelter. The "merciful man is merciful to his beast."

The combination of drought with shiftless farming, idleness and ignorance, coming upon a country leads in the end to famines. An expert writer on famines has given it as his opinion that when the trees are not denuded from a country, but are preserved they afford protection in general to the agriculture and to the people and remove one of the dangerous elements in nature which produce famines. Another good writer has said, "There can be no doubt that one of the causes of the terrible famines in India and China is the unwise denudation of mountain slopes, where the forests formerly absorbed a large portion of the rainfall which now quickly runs off to the sea."

5. *Trees become a source of considerable wealth.* In regard to tree-planting there are sceptics in Manitoba as well as elsewhere. A few failures are mag-

nified and the farmer has been known to give up the struggle saying that trees will not grow. Abundant evidence will be given later that this is a mistake. Few in Western Canada have thus far come to look upon tree-planting as a source of revenue.

Yet with the need of trees for fuel, timber and lumber for building, the enormous demand for pulp wood in the manufacturing of paper, and for the wants of the farmer in fencing greater or less portions of his farm, it is plain that the growing of trees may be made financially profitable. Nebraska some forty years ago, was perhaps the most treeless and repulsive state in the American Union. Through various agencies to which reference may again be made, it has become now so covered with trees that it is said to be the best wooded region of the United States.

A Nebraska farmer gives his experience as to the profitableness of planting trees. Perhaps in some things the conditions of Nebraska would not suit the Canadian West, and perhaps the figures given might not apply to a country farther north, but it is evident that they give a sound basis of calculation.

He says : " I estimate the cost of preparing an acre, and getting the cuttings of maple or ash (they can be had by the thousand along our streams) at \$3 per acre. A man can plant 2 1-2 acres per day. That is all the cost (except cultivation, interest and taxes) for ten years. I have 1361 trees per acre ; seven years from planting I will cut one-fourth or 340 trees, equal to fifteen cords of wood ; the eighth year 15 cords more ; the ninth the same ; the tenth year see my profits. I should cut what is left, 450 trees."

(This is only looking upon the trees as a crop to be removed. A less number might be taken yearly without destroying the plantation.—L.)

"Allow four trees to the cord so as not to overestimate it. I have several trees, only ten years old, which are fourteen inches in diameter and fifty feet

high ; four I think would make a cord. Allowing six trees to the cord we have seventy-six cords and with forty-five cords cut before, 121 cords. At \$3 a cord, allowing \$1 for cutting, I have \$242. I contend that five acres planted to cottonwood, after a growth of seven years, will furnish one family with fuel for one stove a life-time, and sell enough to pay for the use of the land besides."

6 Trees about the farm make it homelike. The struggle for existence in a new country, and the demands on the time of the new settler, whose land is all to break, house and buildings to be erected and many a long journey on business to town to be made prevent much attention being given to the growth of trees. And yet were the information as to planting trees, and the conviction of their importance firmly fixed in the early settler's mind he would not let pass a single year without beginning his plantation.

The hard work and the disappointments of the early settler, the loneliness of his wife and family, and the feeling of strangeness in a new country are apt to make the newcomer think that Western Canadian prairies are bleak, and inhospitable. British settlers coming from the old land feel very despondent over the want of the pleasant homes, and of the green lawns, and pretty flower beds, and fruitful gardens, and over the absence of trees on the landscape as they first see the prairies. Yet it only needs perseverance and adaptation to have all these in a few short years about the home.

The Mennonites settled on an absolutely bare plain in Southern Manitoba. Their villages, in which they live as farmers in communities have every one of them a thriving grove; in it to-day. Every house has in Summer a garden with every variety of flowers. Thousands of tidy homes—in many cases with stone and brick houses—all well surrounded with trees, with large barns and granaries are now

scattered over Manitoba and the Territories ! It only needs the general and persistent planting of numerous forest trees to make our farmers' homesteads homelike, and to make Western Canada equal in this respect to Nova Scotia or Ontario to which fine provinces so many of our people look back as home.

CHAPTER IV.

SILVERING SURRENDERS.

Miss Louie Silvering was a bright and active girl. That she should be made secretary of an important committee at the Forestry meeting was not surprising. She was the first child born in Bowerbank settlement, and was a real Manitoban. Leaving the Bowerbank school, after passing the Government examination, she entered upon and profited by a three years' course in the Winnipeg Collegiate School. Possessed of a quick mind she became a great reader and her choice little library containing works of her own selection by such authors as Tennyson, George Eliot, Motley, Whittier, Havergill, Ruskin, and Kipling, showed her tastes. She was also a fair musician, and every Sunday delighted the heart of the Rev. Robert Brown as in the Bowerbank church she guided the musical service with harmony and dignity.

Immediately after the meeting she had written to Winnipeg and Ottawa and obtained ~~much~~ information on the subject of practical forestry. Reeve Livingston called the committee to receive the results of her enquiries, at his own well kept place, to which he had given the name of Maitland Farm, from his old home in Ontario.

TREES AND GARDENS
Moose Jaw, Assinibola.



6

Livingston's house was newly built and paid for, being the result of several successful years of wheat farming. He had not neglected matters of taste about his home. He did not think a flower garden of some size too trifling a thing for him on a large wheat farm to be interested in. He had success in this. Along the front a well trimmed Caragana or Siberian Locust hedge, with its pretty yellow flowers was thriving. Other hedge plants were also being tried, such as the Russian Poplar, and the sharp-leaved willow. Inside this he had found the Lilac, Flowering Currant, Tartarian Honeysuckle, Snowball, Broom, Japan Rose and many Spiræas to succeed well. Perennials, such as Pansy, Larkspur, Dianthus, Sweet William, Marguerite, Phlox and numberless annuals grew with the phenomenal luxuriance that characterizes Manitoba soil, and Livingston's flower garden from June to October was spoken of far and near as a thing of beauty worthy of a visit from a long distance to see it.

But the glory of Maitland was a tree plantation of five acres in extent on which Livingston had lavished care and hard work. The farm house faced to the south, and on its north and west was the planting consisting of Ash-leaved Maples, Elms, and Spruces, with some highbush cranberries, saskatoons and native currants interspersed to attract the birds by their fruits. Noticing the mistake made by some of planting trees too near the house and thus bringing in great snow banks about the windows, Livingston had kept fifty or sixty feet of open space around the building. The shelter of his planting was also given to the barns, granary, and stables, and other buildings that made up his well-appointed farm-steading.

Everything was smiling at Maitland Farm as the committee arrived in February to hear Miss Louie's report. The public meeting had been so successful that they met in high spirits. William Silver-

ing asked to come ex-officio as pioneer of the settlement, had been rather offish at first, but finally came. Minister Brown was there, of course, and was all sunbeams and good nature.

Miss Louie gave in her report which was well considered and entirely approved. The subject of it was, *the supreme folly of destroying the forest trees*. While she held that this was important everywhere, yet especially was it so in the West, where the forests planted by nature are so small in proportion to the whole area. She had not tried to theorize on the matter, but had obtained information as to the bad results following the cutting down of trees in different places, both in Europe and America. Her collection of facts from farmers, foresters, experts and other men was absolutely convincing.

William Silvering, who was very proud of his daughter and favorably affected by the honors continually pressed upon him by his fellow settlers as "the pioneer," became somewhat mellowed down. As his daughter, in her paper quoted Lord Bacon's saying : "God Almighty first planted a garden ; and indeed it is the purest of human pleasures," Silvering whispered to James Livingston that he "guessed the Almighty knew how to make a world better 'n he did, and perhaps he had better give in."

Some of the facts from Miss Louie's paper are as follows :

Italy, Spain, and Turkey—

"It may be said of a large part of these countries that owing to the injudicious clearing of the forests from their most elevated portions, fully one-third of them are in a state of infertility and insalubrity as unnecessary as it is complete. The tourist in Turkey observes vast pachaliks, once sending many thousand strong sons of Islam to the horsetail standards, now desert and barren, despoiled of their forests. They destroyed the protecting forests : the land parched

into sterility : the strength of the possessors faded in a few generations away."

—*Phips.*

France—

The experience of France has been most notable. "Ruthless destruction of the forests gave a fresh stimulus to the work of devastation, which Minister Sully, in the 16th Century, had tried to check. The usual results have followed in the frequency and destructiveness of floods, which have washed away the soil from the hill sides and valleys of many districts, especially in the south, and the frequent inundations of the last fifty years are no doubt caused by the deforesting of the Rhone and Saone.

—*Cleghorn.*

In the region of the Pyrenees, the slopes of the mountains were denuded of their forests and the rains having nothing to hinder began to form eroding torrents, the south slopes suffering most because first cleared and directly exposed to the sun's heat. The extremes of flood and drought became excessive, and extensive tracts have been ruined for present occupation from this source."

Island of St. Helena—

"When first discovered in 1502 it had heavy forests. The introduction of goats and other causes destroyed these woodlands until the island was almost denuded. The consequences were that in the records of the last century we find accounts of repeated and almost periodical visitations of very severe drought, occasioning various losses to cattle and crop efforts."

Ceylon—

"It is principally on climatic considerations that the cutting down of forests seems to require Government supervision. There is good reason to think that in tropical countries the removal of wood operates effectively in reducing the rainfall. The mischief al-

ready done in Mauritius and various West India Islands is widely spread (being in some, indeed, irreparable). Urgent steps should be taken in the case of an island so beautiful and at present so fertile as Ceylon to save it."

—*Hooker, the Botanist.*

Khanate of Bucharia—

"This was within fifty years one of the most fertile regions of Central Asia. Some forty years ago a mania for clearing seized upon the inhabitants, and all the great forests have been cut away, while the little that remained was ravaged by fire during a civil war. The consequences were not long in following, and have transformed the country into a kind of arid desert. The water courses are dried up, and the irrigating canals empty. The moving sands of the desert being no longer restrained by barriers of forests are every day gaining upon the land."

India—

No country presents a more melancholy spectacle in this matter than India, the land of droughts and famines. Many authorities apprehend that the western and southern provinces of India are, owing to the destruction of the forests, threatened with a danger which is feebly checked, and, which, if not arrested, may seriously affect the best interests of the country."

—*Sir Richard Temple.*

Germany—

"It is then indisputable that the forests exercise a salutary influence on the temperature of a country. The sanitary condition of man and of domestic animals, as well as the growth of cultivated plants, immediately depends on the climate of the locality. Epidemics unknown before, may perhaps, be attributed to a climatic change brought about by the destruction of forests."

The fertility of a country depends on its supply of forest land, for on this depends the foundation of

soil, the precipitation of dew, and fall of rain, the steady current of rivers, the mitigation of the evil influences of unwholesome winds, and the growth of vegetation in the fields and meadows. The great fertility of certain tropical regions, as we have shown with respect to Madeira and the Canaries, is in great part due to the extension of forest land."

Professor Schacht, (Bonn).

Kentucky, U. S.—

"I remember when the forests were hardly broken here that springs of water were very frequent and perennial. The rivulets and creeks are now dried up in summer, and the fish so often caught by me in earlier years are now gone. Not one spring in a thousand remains. The rainfall, if the same as of old, rushes off at once, sweeping the soil into the Mississippi delta. The dry winds absorb not only the ancient humidity of the air, but drink up the subsoil evaporation. So that our winters are longer, more changeable, and unendurable. Corn can hardly be planted safely till late in April, and drought too often ruins our best efforts."

—*Clay.*

New England—

"As moderators of the extremes of heat and cold, the benefits derived from extensive forests are undoubtedly, and that our climate is gradually changing through their destruction, is apparent to the most casual observer. Our springs are later, our summers are drier, and every year becoming more so; our autumns are carried forward into Winter, while our winter climate is subject to far greater changes of temperature than formerly. . . . The failure of many crops ascribed to the expansion of the soil, can be referred to the destruction of the forests keeping the soil under their shade, cool in summer and

warm in winter, acting at once as material barriers, and reservoirs of moisture."

Professor Sargent (Harvard).

Ontario, Canada—

"Where settlement has existed for at least twenty-five years, three-quarters of the forest has been destroyed, while in few cases, is the preserved wood distributed over the surface with any regard to its protecting influences. The results are : 1. A cold, raw spring, with high winds and frequently much dry weather during germination. 2. A hot summer, with but little rain. 3. An irregular winter, with frequent high winds, irregular snow falls, etc."

Dr. P. H. Bryce (Toronto).

Now this is very convincing, but there is a tendency on the part of farmers to smile at reformers and experts who bring forward new notions. They suppose the new men to be possessed with some "smartness," but they smile at 'book-farming,' and at anything new to their experience. They tell stories about young upstarts who perhaps went to the Agricultural College, or at any rate who pretended to farm, in the same way that the housewife makes her dishes from the Cook Book, and they say the farmer who farms by book, and the cook who cooks by recipe, will end in failure.

So the thought of putting forth any effort to save the forests, or for the Government to protect the woods by permit, or to do anything else than go to the woods when you like, and to take just as much wood as you want, and to clear up as much bush as you feel inclined, is like interfering with the fixed order of nature, if it is not, indeed, a questioning of Divine Providence.

And yet when we think of how the use of the stock book, and the cultivation of breeds, have given the 'high-bred' and profitable cattle in place of the miserable 'mongrels' of early Canada ; how the intro-

duction of high bred horses has replaced the weak and treacherous shagganappe or Indian ponies ; how the splendid Yorkshire and Tamworth swine have left far behind the 'saw backs' and 'fence viewers' of early Ontario, it must surely be admitted that it is worth while to listen to the expert and the experienced observer in the matter of forest preservation.

If every one admits the value of new machinery, and new methods of raising grain, and rejoices with pride in the butter, cheese, cold storage and other improvements of Canadian farming, is it too much to expect that Canadian and especially Western Canadian farmers, will use their intelligence to see that tree destruction means wealth destruction and that the very comfort and success of the farm depends, other things being equal, on their saving and extending the forest.

CHAPTER V.

BOWERBANK UNANIMOUS.

The February Forestry meeting in Bowerbank was large and interesting. Miss Louie Silvering gave in her report with grace and was highly commended. Her father took occasion to remark that he had been thinkin' over this matter of tree plantin' a good deal, and though he had said somethin' ag'in it, yet he remembered hearin' in the old 'protracted meetin's' in Norfolk County,

“That while the lamp holds on to burn
The greatest sinner may return,”

so he wanted to take back most of what he had said on the subject, though he would say that no one had yet convinced him.

Minister Brown was the orator of the evening. It was noticed that he had now much to say in his sermons on Sundays about trees, and flowers, and gardens, and that his very last had been on "He Shall Be Like a Tree," from which he described the "perfect man." A good many said that somehow Minister Brown's heart was softening considerably. At the close of the minister's address, a unanimous vote was passed by the gathering in favor of his views. It is worth while quoting his address.

He said : If as the fair secretary has shown in her report it is a piece of folly and a damage to the country to destroy the forest trees, it is then but a step to the position that the Government ought to reserve large bodies of forest trees, and preserve them for the good of the country.

But shortsighted people speaking as they claim on behalf of the new and poor settler tell us that this is cruel, tyrannical and unwise; that we are sacrificing the pioneer and the poverty-stricken man for the sake of his successors who will not likely be so needy as he ; such people say, with a great show of shrewdness, and apparent wit, " What has posterity done for us ? "

My answer is. *First*, That it is never proposed to prevent a judicious use of our forest reserves. A tree like a man becomes old and then falls. Old or fallen trees ought to be removed from the forest for its better growth, and a certain proportion of full grown trees should be removed every year in order that the young and growing trees may the better thrive. The Government Agents will give permits to the settlers for sufficient wood to fully supply their wants, and no hardship can ensue.

Second, It is an absolute loss to the pioneer or first settler to sacrifice wilfully all the timber of his neighborhood, for before his first ten or twenty years have passed he leaves himself shelterless, and a gen-

eral policy of this kind will in the time specified bring the trials of drought, floods, and related evils.

It was in consequence most wise and patriotic for the Hon. John White, in his very short but brilliant career as Minister of the Interior in Sir John Macdonald's Government in 1883 to reserve certain blocks of timber in Manitoba and put their wood under restriction in order that they might be husbanded.

From that time to the present the same wise policy has been adopted and the following reserves have been made : The spruce woods, south of the Assiniboine, Turtle Mountain, Riding Mountain (fifty-three townships in extent), Moose Mountain, Cooking Lake of North Alberta, Foot Hills of the Rockies, Forest Park, of Western Alberta, Louise Lake Park in the Rockies, and Sand Lake Park.

And yet these all together would only make a block 70 miles square, and would not be 1-50 of the wild prairie country through which the reserves are scattered.

Precious, then, are the patches of green on the wide prairie area; every means should be used to retain and judiciously to use them, for the good of the present settler, and for the good of the future toiler on the plains. "The greatest good for the greatest number" is the only true social maxim.

Protection for forests—

The unwillingness of selfish or dishonest persons to obey the law and keep the reserves as they are intended for the general good, makes it necessary for the Government to appoint men to protect the forests. The Land Agent in each district has charge of the supervision of these wide areas. It is quite plain, however, that one man in a region comprising a block of territory fifty miles square cannot guard a reserve from illegal intrusion.

Ontario and Quebec as well as many other provinces and states have found it necessary, not only to

protect from the timber being injured or removed, but also from forest fires, to appoint fire guardians or rangers during certain months of the year. The Mounted Police in the Northwest Territories and in Manitoba have done excellent service in patrolling the reserves and thus in protecting them from great damage.

The plan of exacting a small payment for permission to cut wood in the reserves, when well looked after by vigilant guardians, can be made very successful. Reasonable restrictions such as that no one should be allowed to cut a tree which will not measure up to 8 to 12 inches across the stump two feet from the ground, and that setting fire to the reserve should be a penal offence, as well as involving a withdrawal of all privileges from those who wilfully break the regulations, will do much to preserve the heritage of its trees to the nation of the future.

In 1885 thirty-seven fire rangers were employed in Ontario, at a cost of \$4,000, half of which was paid by those to whom permits had been granted. In 1891 there were as many as 98 rangers on the limits of thirty-seven lumbermen. Imperfect as the system in the Canadian provinces is, as compared with the protection of the European forests, yet it is claimed that the forest rangers of Canada have saved millions of dollars' worth of forest.

Australia—

In New South Wales there is a Forestry Staff consisting of an inspector, 28 foresters and 10 assistants. The licenses impose restrictions as to the size of the trees to be cut and none are allowed to be felled within a chain and a half of a navigable river.

Victoria has not succeeded so well. Its first act did not meet the case, but a new law was passed a few years ago which provides for the formation of state forests and timber reserves and their management

and also that of other products of the forest not included in the reserves.

South Australia has taken a great deal of pains with its forests. For ten years upwards of a quarter of a million of dollars was spent upon improving the forests, and it is worthy of note that in timber sold and land rented the receipts met the expenditure. Every year shows progress in the successful plan thus begun.

Cape Colony,—

Which as a part of South Africa, has proved so absorbing to us during this last year of war, has a lesson to teach us in tree planting. Nearly twenty years ago the Director of Forestry divided the forests into blocks, and the blocks into sections. "Felling" is said to proceed in sections so regulated that the first section cut may develop into mature trees by the time the cutting of the last section has finished, and there will be no necessity at any time to close the entire forest for cutting. The period for the revolution of cutting has been fixed at forty years.

Guard against fires—

To any one who has been an extensive traveller through the forest areas of the Canadian West, there come back sad pictures of the ruin caused by bush fires. There is no need to sit with surprise as some old settler from New Brunswick tells of the Great Forest Fire there in 1825. "Toward evening a rumbling sound was heard, then a breeze, and last a hurricane bringing flames, cinders, ashes and hot sand, so that simultaneously several hundreds of square miles were wrapt in one blaze."

Mile after mile of blackened trunks in Manitoba, where once stood thriving groves of poplar tell their sad tale. To-day on the prairies a single blackened skeleton of oak stands to tell of some "oak hummock" or wooded ridge that has been completely denuded by fire and northern blast !

What can be done to stop the fires and save the forests ? A western surveyor has given some thoughtful suggestions on this subject. The sources of fires are the prospecting, hunting and surveying parties, as well as bodies of settlers and Indians travelling about for business or pleasure. There being no stopping places in the forests, the travelling parties are compelled to camp out. These camps are the source of the mischief. Hot ashes and live embers are left behind to start the fire when the traveller has passed on.

Now that lines of railway are cutting their way through the forest, a continual source of danger arises from the sparks cast about by the engines. Further bands of settlers are desirous of obtaining land for cultivation ; others knowing the black wood may be allowed for use by the Department are not sorry to see the forest fire supply their expectations ; while accident, lightning, high winds, and other causes make the fires on the blocks of the forest terribly effective for damage. The suggestions made by one thoroughly competent writer are : "If in a system of guardianship, the guardians were placed as residents at suitable points along the main trails, with authority to enquire into the business of parties travelling along them, to register the name and residence of such parties, and to warn them to exercise caution in lighting and extinguishing fires built for camping purposes ; at the same time stating the penalties under the law for starting bush fires, it seems that a distinct check would be placed upon the frequent occurrence of these disasters, and a means provided to bring the origin home to the parties responsible therefor."

Study of the matter of forest or prairie fires shows us that it will not be sufficient to take steps to check the fire after it has got under way. A fire with a strong wind such as is seen in the West, will run with wonderful velocity unless checked by mountain, river or other great barrier. Action must be

taken to prevent the fire beginning. One important precaution is that the forest protectors with the help of the settlers keep the space under the trees free of the dry underbrush, fallen trees and other rubbish that accumulate there very quickly.

Perhaps the most useful expedient for checking forest fires is the constructing of a fire guard at certain fixed intervals through the block of timber. This is a long and broad line, the wider the better, cut through the forest, with the felled timber all burnt up, or taken away by the needy settler. In addition all underbrush and debris of the forest must be absent so that no communication can be had from one side to the other, and the clearing so wide that the fire may not jump across it from side to side.

It is evident also that the prevention of prairie fires is necessary if forest destruction is to be met and overcome. Frequently a hot fire takes the long grass in a coulee and makes so dangerous an agent that men and animals are at times overtaken and destroyed. A fire on the open prairie is driven with great force by the wind which has such full play there, that when it comes to a bluff or planting in a dry season it may lick it up in a short crackle of flame, and destroy it with wonderful completeness.

It seems absolutely necessary that stringent laws should be enacted everywhere as they have been in Manitoba and in the Northwest Territories, with severe penalties attached for starting a fire, or allowing it to be started. All magistrates, Mounted Police, provincial or territorial police, forestry agents, fire guardians, etc., ought to be required to pursue wrong-doers in this matter and thus be the means of preventing the ravages of fire. Lessees of timber limits and holders of permits, should be responsible for accidents occurring under their notice, or for neglect by which the property of others is injured by these fires. The Manitoba Act as well as Northwest Ordinance, is

very wide and effective for the prevention of fires.

Provision is made for the appointment of a chief fire guardian, and under him the whole male community of age and of good health are bound to turn out under severe penalty and assist in putting out the fire on the prairie or in the forest.

As the prairies are filled up the dangers of fire are largely reduced. In certain parts of Manitoba the settlements are now found to consist of fenced farms and improved roads. Here the small poplars are growing up densely, because fire cannot now reach them.

In these districts places once open prairie are now covered with flourishing groves, wind breaks and hedges. The law-abiding and public-spirited people of our Canadian West show signs of rising to save the forests and to count him an outlaw and public enemy who transgresses the forest laws.

CHAPTER VI.

FRIENDS IN COUNCIL.

It is Bonspiel Week in Winnipeg. At this time in February there is a gathering of half a thousand curlers, with their bonnets and besoms, and hundreds of members of Benefit, Temperance, and Farmers' Societies. Dairymen, Horticulturists, Stockraisers are all assembled and this year, among the rest was the new Forestry Association. Its members included men like the Reeve of Bowerbank, and a number of representatives from different parts of the country. The meeting turned itself into a useful conference of Friends in council on the growing of trees.

After the President had emphasized the importance of Forestry, he called attention to the fact that

the Canadian West is a vast region—at least a thousand miles from east to west and several hundred from north to south. The Red River valley or first prairie level is less than eight hundred feet above the sea. The Brandon district is twice that elevation, while the gradually ascending prairie reaches three thousand feet above the sea at Calgary, in the third prairie steppe.

Now the elevation and other conditions must be considered when the kinds of trees are selected, and the methods of planting and culture are being decided on. In the foothills of the Rockies the Chinook winds are powerful influences, in Northern Alberta and down the Saskatchewan trees already abound, Red River valley is much more sheltered than Brandon district and so on..

How then to meet the case was discussed. One after another gave his experience from points of Manitoba, but several speakers wanted information as to whether it would be possible to get general tree planting. How can the Government carry out a general plan ?

A professional gentleman present who had lived on the continent of Europe undertook to show that such a plan was feasible. He said : Hanover in Germany has two millions of people and has nearly a million acres of land—that is ten per cent. of the province in trees. It has some four thousand overseers and assistants besides laborers. The receipts from forests are a million and a half dollars a year, and besides paying expenses the forests yield a profit of more than three quarters of a million. Their plan is to have the new crop of trees advancing as the old one is cleared out and sold.

France is perhaps the most marvellous example of success in tree planting. It has about a thousand foresters and assistants besides laborers, and the best Forestry School in the world at Nancy. On the coast

of Gascony where there is a stretch of one hundred and fifty miles of dunes of loose sand a forest of pine trees has been planted from two to six miles wide. A large region of marshy land has also been drained and planted with pine trees. The blowing sands which threatened formerly to destroy agriculture on the coast are now bound down by these useful forests. This intelligent traveller then cited marked examples of success in forest growing in Switzerland, Russia, and Italy. (Applause.)

A lively American professor next took the floor and after a good many flourishes, got down to his subject, and gave a remarkable statement as to the State of Nebraska. That state was formerly almost all treeless. It was dry and intractable. Fortunately for the state thirty or forty years ago a number of strong nursery companies undertook to plant forest trees. The railway companies and several large farmers took hold of the matter and the results are astounding.

Deep plowing and constant cultivation are the secret of their success, Catalpa, Russian Mulberry, and Black Locust, with other soft wooded trees have been used, Ash and Box Elder have also grown well. The Crete Nurseries have gained a great reputation for their work in Nebraska. They have proved the advantage of nursery grown over "river-pulled" or "sand bar" forest trees. Probably no state of the American Union has a greater forest area to-day than Nebraska with its artificial forests. (Cheers.)

The encouraging addresses fully convinced any doubters who were present, and adjourning full of hope, the members made good resolutions personally to plant trees in the coming spring and endeavor to advance the movement so heartily undertaken. There will yet be many Bowerbanks in Manitoba and the Territories.



LAKE KILLARNEY.
(Road and Trees)—Southern Manitoba.

1978-8

CHAPTER VII.

CANADA'S FRIENDS.

Land of the Maple Leaf ! This is Canada's most distinctive feature and our favorite patriotic song is "The Maple Leaf Forever !" Long may it be so. A people living among their forests, and cultivated farms, following the arts of peace and only seizing the sword and rifle at the call of duty ! A people delighting not so much in great cities, but in the sylvan shade of farm and village life !

The last thirty years or more has seen a nation grow from a number of scattered provinces, and though Canada is fairly northern in situation and has a bracing climate yet great progress has been seen especially in the education and enlightenment of her people. A resident of a very barren country was once asked by a prosaic visitor what they grew there ? The answer given was, We grow men ; 'Canada may fairly make the same boast. Competent men ! faithful and trusty men !

Whether there is proof of the fact that Cincinnatus, the true and honest leader in the days of Roman disaster was brought from the plow, or that Lincoln rose from the prosaic work of splitting trees, the fact remains that the cultivation of forestry has drawn to it a number of most honored names. Chief among these in Canada is Sir Henri Joly, the popular Governor of British Columbia. He has for so many years followed forestry, writing books on the subject, and using much personal influence to advance in it Lower Canada, that he has become a veteran in the cause. Mr. R. W. Phips, of Toronto, to whose excellent report we make frequent reference, has shown great industry, skill and enthusiasm, in convincing the people of Ontario of the value and necessity of preserving and replanting forests.

It would be difficult too to find a better body of men than we have in charge of our Government Farm and Experiment Stations, especially as most of them know the value of and do their best to advance forest growing. The men in charge of this work throughout the Dominion are good and adaptable agents. This is needed. Men of alert mind, perseverance, shrewdness, and saving common sense.

There is the burly Chief William Saunders ; and the good natured "weed and bug" man as he calls himself, Dr. Fletcher; the son of Canada's noted botanist, Macoun ; the western men well and favorably known—the obliging, competent and progressive manager of the Government Experimental Station at Brandon, S. A. Bedford, and the respected and successful Scotchman, Angus Mackay, of Indian Head.

The appointment in 1898 of Mr. E. Stewart as Director of Forestry for the Dominion was a most fortunate one, and the founding of the Canadian Forestry Association was a forward step.

All these men are a credit to Canadian wisdom. They have joined in establishing scientific stations for experiment, and in endeavoring by intelligence to raise the standards of farmers and farm life in Canada. When farming can be made not only a paying thing, but also a thing that creates interest and not indifference in the mind of the farmer and his family; when the lonely homestead on the prairie quarter-section is transformed into a comfortable and attractive place with trees, and gardens, and avenues and forest belts, then there will be no difficulty in making many more call it home.

Farm life after the struggles of the first few years of settler's life in Manitoba and the Territories may readily become a joyful and happy life. No country in the world returns so quickly a reward for labor. There are no forests to clear, but the virgin prairie lies ready for the plow, and when the settlers

are healthy, strong, ambitious, hard working, free from false pride, and possessed of common sense, there is not the slightest doubt of their succeeding and of their having smiling homes.

The men, who are leaders then from Saunders to Mackay, are doing what? They are leading the way to comfort. They say prepare the soil, enclose gardens, raise hedges, plant avenues, grow plantations of trees and wind breaks, surround your homes with comfort and beauty, as well as plow, and sow, and harvest, and market the golden grain, or raise the stock on the farm, or carry on the dairy or the creamery. It is not only "being" you see, but "well-being;" it is not a humdrum purposeless life, but a life practical in the highest sense as cultivating the higher as well as the lower necessities.

There is nothing more inspiring to us as Canadians than to know that the growth of forest trees, and shrubs, and plants, and flowers, as well as cereals and vegetables receives full attention. A writer has spoken of being a guest on a great occasion at the Ottawa Experimental Farm. It is a place of enchantment. A wide, high lying expanse that before was none too beautiful has been transformed by trees and roads and flower beds into a fairy scene only on a larger scale than what every prairie farmer may have if he will simply gather himself together, prick up his ambition and give the time and attention that it requires to make his unkept, neglected, treeless, unsheltered, and dreary homestead break forth and blossom as the rose.

Visit the Brandon Experimental Station. The high boundary hills along the Assiniboine River at Brandon, if they were generally as beautiful as well planted and well cared for as the Experimental Farm might rival the banks of the Seine below Paris in France, and the two are somewhat alike. Here long rows of Maples, Elms and very many varieties of

trees, make avenues that remind one of the pretty avenues of Queen's Park, Toronto. The situation of the buildings, the Arboretum, with its labelled trees, the trial plantations, and growing fields, are well worth a visit, especially under the obliging custodian, who is never weary in his attentions.

Hasting along in Canadian Pacific Railway car the eye is wearied by the interminable prairie scenery, of Eastern Assiniboia. You sigh and say, Oh for the stately trees of old England, or the leafy woods of Ontario ! when suddenly your attention is arrested by extensive plantations. A stream is dammed up to supply wafer, long rows of avenue trees are seen a mile or more away, thick and luxuriant hedges of Maple, Poplar and Caragana enclose numerous gardens and surprised you ask, What is this? The porter replies : This is Indian Head Government Station, and the thought of the sturdy Mackay comes pleasantly before you.

And after two days more, and the eye has been tired almost to death by the vast prairies of Western Assiniboia, and Alberta, past the peaks and grandeur of the Rocky Mountains and Selkirk and other ranges which arouse the imagination, you first stop to see Kamloops, the dry and barren spot, where irrigation has caused fruitful orchards to grow and the desert to blossom as the rose. Flying on soon we see what progress has been made in teaching the farmers of British Columbia, who in old times were mostly miners, and traders, and fishermen—teaching them the vast opportunity afforded them as a fruit growing country in the Eden-like gardens and orchards at Agassiz, British Columbia, under Superintendent Sharpe. Surely man's skill guided by a Higher hand has made the wilderness glad.

CHAPTER VIII.

STORY OF AN EXPERT.

Judge Haliburton, commonly known as "Sam Slick," wrote a number of very witty books, one of which was called, "The Letter Bag of the Great Western." We propose to give now in regard to the matter to which William Silvering became a thorough convert letters from a number of experienced men in our Great Western Country. All these are the testimony of worthy and reliable men who uphold the opinions of Minister Brown and Reeve Livingston.

A pretty town on the Canadian Pacific Railway very near the western boundary of Manitoba and therefore not far from Assiniboia is known to travellers as Virden. The soil here is perhaps rather light, but Mr. John Caldwell, an expert of the town with years of good standing, tells his story :

"No doubt many say this last spring and summer (1900) brought a bad failure in tree growing. For thirty years we reply there has not been such a season in the Canadian West. We have planted about two hundred thousand trees, and to-day 90 per cent. of the seedlings and 65 per cent. of the cuttings are thrifty and doing well"—and this in Virden district.

True, a well known authority of Brandon lately said, "I can take you to dozens of places in my part of the country, where there may be seen hundreds of small stumps of Maples and Elms that have grown for a short time and then perished. These make a melancholy sight. The gentleman, on being questioned, stated that "unskillful cultivation and neglect" were the cause of all this."

The expert then states the conditions of successful tree growing.

Varieties of trees—

The trees must suit the climate. Our best, and in

the order named, are : 1. White Elm ; 2. Manitoba Maple (Box Elder) ; 3. Russian Poplar ; 4. Balsam Poplar ; 5. Cottonwood ; 6. White Spruce.

The Manitoba Maple is probably our best known tree. Some have objected to it as not growing to a great size, as soon decaying at the roots, and as a great attraction to insects, but in the open country we are fond of it, though it seems to be unpopular as a shade tree in towns and cities.

Acclimation—

Trees should not be brought in from Ontario or the eastern provinces or states with the hope that they may thrive in the West. They will not as a rule. Not only is precious time lost in planting them, but the discouragement following is very hurtful to tree planting. As well try to grow oranges in Anticosti or to establish the Banana belt on Lake of the Woods as get eastern trees—either forest or fruit trees—to thrive with any certainty in the West. Experience at Brandon showed that White Elms, sprouted from seed, sent from Ottawa, were yet too weak to succeed in our western climate. Care should be taken that all seedlings or cuttings used in our hedges and plantations are grown in the West, or at least in the adjoining states of Minnesota or Dakota.

Preparing the soil—

Whether for sowing seed or planting seedlings and cuttings, the ground should a year before sowing or planting, be plowed, harrowed, thoroughly pulverized, and not a weed left to disturb it. In the year following the *preparation*, the seed may be sown either broadcast or in narrow rows. Narrow rows make less cultivation necessary than broad rows do. This is really the nursery man's stage.

For ordinary farmers it is better to get seedlings or cuttings thus grown by the nurseryman. When the farmer has his ground ready he should get seed-

lings a year old and plant these in rows three or four feet apart and say three feet from each other in the same row. After two or three seasons more these may be again transplanted into the avenue, wind break, or plantation.

Wintering—

In order that the seedlings may be ready for use they are taken up in the Autumn and kept for Spring planting. Cuttings are portions of the growing stem, generally of Poplars, Willows, or other soft-wooded trees. These are taken in the Autumn when a few frosty nights have loosened the leaves, or if in Spring not till after the stem wood is full of sap, but before the buds begin to burst.

When taken in Autumn, seedlings or cuttings should be buried in sand, about the end of October, under the ground. Before burying the young plants it is well to dip the roots in water. Should seedlings or cuttings become frozen in early Winter, no attempt should be made to thaw them out. Even after the ground is frozen soft earth may be had from under a manure heap or pile of straw for use in covering.

Planting—

About the middle of May—always watch for Arbor Day—take the seedlings or cuttings to the well prepared strip of soil, and with a dibble or sharp-pointed stake make a hole to receive the cutting. The cutting should be down six or seven inches, leaving two inches above ground. After setting it, the earth should be tramped hard about it.

Seedlings of the Manitoba Maple should have the fibres cut from the roots, and the tap of the root removed, and then be planted an inch deeper than when in the seed bed where they grew. The roots of seedlings should be well spread out, and the plants well watered when planted.

Cultivate ! Cultivate.—

The real work of successful tree growing now begins. Failures in the past in nine cases out of ten were from neglect after planting. Continued effort is the secret of success. Just as the motto for the orator was declared to be Action ! Action ! so the motto of the tree grower is Cultivate ! Cultivate ! This may seem unreasonable, may be called a "fad," may seem to some to leave out the element of a benevolent Providence, but it is the sole road to success.

"What harm," said William Silvering, "can a few weeds do ? It don't kill my garden or my potato patch, or ruin my wheat field to have a few cockle or nightshade or mustard plants. But that was before William Silvering's repentance.

Cultivation is essential. 1. To loosen a layer of soil on top to keep the moisture in the earth. When the soil is allowed to form a hard crust, or cake, it makes a good conductor to take the moisture from beneath. Cultivate as soon as the slightest crusting begins to appear.

2. Weeds, must be destroyed, else trees will not grow. A weed serves as a medium or conductor for carrying the moisture from the earth to the air. It has been said that two large weeds near the base of a tree will take away as much moisture as would keep the tree alive. Wisdom then says, Cultivate and destroy the weeds. Of course this patient care is only needed for two or three years. After a few years the trees thicken, the leaves spread, and the soil below the tree becomes so shaded that the baking by the sun does not take place, and the weeds cannot grow. The farmer then enjoys the beauty and protection of his avenue or wind break.

Protection—

Our hardier trees need no special covering in Winter. Bushes and roots should not be tied up in bundles, when covered, but should be spread out and

laid quite flat before being covered. Manure should not be used for this purpose, but loose damp soil. Manure may be spread upon the ground to catch the snow, and may thus be of service. Snow is really Nature's blanket spread upon the earth for retaining warmth in it.

Large trees—

What has been stated as to seedlings, and cuttings applies in the main to large trees, when these are transplanted. To prevent too much evaporation, all the upper branches of a tree, say three inches in diameter, are cut off down to about eight feet from the ground. Heartless and destructive as it may seem to mangle the tree yet the motto here must be, *Amputate! Amputate!* Roots, fibres and tips are before planting cut off to avoid too much moisture being absorbed:

For the large tree a hole four feet across and from one and a half to two feet deep, should be made. Into the bottom of the hole about the roots of the tree the best soil or humus is thrown—three parts full—and the subsoil kept for the top. If the soil is dry about eight pailfuls of water should be thrown into the hole and mixed thoroughly with the humus. The soil is thoroughly tramped, and the tree thus firmly established.

Watering—

Too frequent watering is not good for newly planted trees. This is because watering is usually only superficial. It immediately evaporates, and leaves not a trace behind. A good plan of watering is to take away the soil from the foot of the tree for, say, two feet around the tree to the depth of three inches. Into this hole pour six or eight pailfuls of water. When the ground is thus thoroughly soaked the hole may be well filled in with sod to the top.

Thus water enough is supplied to the tree to meet its needs for two weeks.

Persevere!

Like all other good resolutioners tree growers are active for a time, but become weary in well doing. From May to June or July everything is well done. Weeds are kept down, the soil is loosened, watering is not neglected, but in August and September, just when attention is needed the tree is left to fare for itself. August is the drying time. Care in August compares with attention in May as two to one. No doubt, says Mr. Caldwell, some may differ from me in points here and there, but if so it only illustrates what old Chaucer said more than five hundred years ago :

"For divers people seemeth diversely."



CHAPTER IX.

THE WINNIPEG LETTER-BAG.

So great a change has come over Winnipeg, from the bare prairie we once knew to the city which draws the attention of tourists as now well wooded in beautiful boulevards, pretty parks, and its improving cemetery, that it was thought well to search our letter bag and find what had come to hand. Several letters spoke of Winnipeg and vicinity and we think these worthy of notice :

City of Winnipeg,
March 1st, 1901.

My Dear Sir :

I would like to tell you of our fine parks and their short history. It was only six years ago that we made a beginning when I was appointed Landscape-gardener for the city. Land had been bought

for a number of small sized parks, but it was bare and waste.

Central Park. This now beautiful park lies in the right angle between Edmonton St. and Qu'Appelle Avenue. When we began work (1894) it was a mud-hole and could not be drained. The citizens laughed at Parks Board and Gardener. Parts of this park were two feet too low, and no sewer had yet reached it. The land was sour and soaked with stagnant water. The first thing done was to plow up the soil along the boundary and out on the street into long ridges. In the deep hollows long manure was thrown, thus raising them, but the trees were planted on the ridges inside and outside the park.

As Elms, Basswoods, and a few Ashes were planted, scores of people ridiculed the whole matter. The trees used were about two inches in diameter, and they were cut back to within a few inches of the trunk. Ninety per cent. of these trees have lived, the stems are six inches in diameter, the branching is twelve feet across, and the park is beautiful.

Assiniboine Park (Fort Rouge). A few scattered trees were here in 1894. The plot was grubbed and underbrushed, and about three hundred large Elms and Basswoods from four to six inches through the stem were transplanted to the spot. As the land along the river bank is always higher, the rear was drained by putting in two thousand feet of tile drain; the edges of the walks were sodded, and a lawn made. A few flower seeds were put in by the gardener at his own expense. They succeeded so well that the Parks Board next year built a small greenhouse."

Victoria Park (Rupert Street). Nothing was done here till September, 1894. Sixty-six Manitoba Maples with stems from three to seven inches in diameter were transplanted to this plot, though they were rigidly cut back. Sixty-four of these trees are thriving to-

day ; their trunks are from eight to ten inches and the heads are sixteen feet across.

Selkirk Park (Flora Avenue). Elms and Basswoods were planted in this park which lies north of the Canadian Pacific line, and ninety per cent. of these thrive to-day.

St. John's Park (Main Street). This is becoming a beautiful park with its thousand and more of healthy Basswood and Elm trees, and will be a great blessing to the working people of the north of the city. The city at times supplies a band and the park is becoming a place of popular resort.

Dufferin Park (between Alexander and Logan). Yet new, but showing some promise.

Brookside Cemetery. Years ago thousands of dollars were spent to little effect in attempting to grow trees in this city of the dead. In 1897 the cemetery was taken over by the Parks Board. There are now growing three thousand thrifty trees (Elms) and shrubs. There is little water at the cemetery, but notwithstanding eighty-five per cent. of the trees and shrubs planted in the last three years are thriving to-day.

Boulevards. The city has planted three miles of boulevards, which, with their green grass plots and thriving trees are the pride of the city. It is the intention of the Superintendent to plant six or eight miles more during the Spring and Summer of the present year.

Fort Garry Gateway Park. Ought to be begun at once, and we hope to signalize Arbor Day this year by beginning planting here. Winnipeg has been known as the Prairie City. We hope to be able to call it before many years, "The City of the Elms."

Yours truly,

D. D. ENGLAND.

At Home,
Feb. 6th, 1901.

Sir :

I believe Mr. J. S. Dennis, of Regina, was the pioneer in planting trees in Winnipeg. Some years ago when he lived on the Hudson's Bay Reserve in your city it was destitute of trees. He and others were the first to plant some, and all know the result. Trees have done a great deal to impress people with Winnipeg. The municipality there passed a by-law giving persons growing trees in front of their lands a rebate on their taxes. Houses having trees are far more readily saleable than others.

Yours, etc.,

F.

Nelson, Man.,
Feb. 6th, 1901.

Dear Sir :

I live in the Red River Valley near Pembina Mountain. Many years of life upon the prairies of Manitoba have deepened an early conviction that every man who seeks a home there should pay much attention to the growing of trees about his home buildings. Where the farmer has planted trees that are now shelter belts they in many cases have grown to be more valuable to the farm than all the buildings he has been able to put upon it. There are few standard trees for the prairies. The most desirable are Ash, Elm, Manitoba Maple, Cottonwood, and Russian Poplar. As to Evergreens more of them have been planted this year than during any single season in our history. The following varieties of Evergreens have been perfectly hardy at Nelson : Scotch Pine, Balsam Fir, White Spruce, Native Spruce and Arbor Vitæ. But in growing trees my last word is, *Cultivate.*"

Faithfully yours,

A. P. STEVENSON.

CHAPTER X.

BRANDON AND THE BUFFALO PLAINS.

Brandon lies high. It is the beginning of the real Buffalo plains, where thousands of buffaloes ran wild a century ago. It is as high again above the sea level as Winnipeg. Its prairies are rolling and generally more treeless than the Winnipeg basin. West and southwest of it lies the finest extent of well farmed country to be found in the Canadian West. Its soil and conditions are different from those of the Red River Valley. It is the great cereal region of the West. As the Canadian Pacific Railway runs west it passes rising towns, and last in the province of Manitoba the town and district of Virden, in which lives John Caldwell already described as a man of enterprise and experience.

The central figure of the Brandon district is the experimentalist, Mr. Bedford. For eleven years or more he has been carefully testing the qualities of scores of varieties of forest trees and shrubs. His account of his success is modestly given, but visit Brandon and you have nothing to do but "look around you" to be convinced of the value of his work. His experience is now becoming large and therefore to be depended on. The last five years have been very reassuring as to the possibility of tree culture becoming widespread throughout the Canadian West. He says:

'95,

Notwithstanding a low Summer temperature this year, a fierce hot wind for two or three days in July, a heavy storm early in August, and a somewhat early frost toward the end of August, this year was successful so far as the planting and growth are concerned, all the trees planted having lived and become well established.

During this Spring one and a quarter acres were

planted at the west end of the farm, near the main road. Two year old Manitoba Maple and Elm seedlings were used for this purpose.

The plot selected was summer-fallow, the soil a sandy loam. It has been found advantageous to the young trees to plant on summer-fallow because this retains a good supply of moisture, and very little cultivation is necessary to keep the trees free from weeds the first year.

The method of planting was as follows : The plot was harrowed and rolled, a horse-marker was then used marking the field both ways from north to south and from east to west, so subdividing the plot into squares, four feet by four, and making it possible to cultivate both ways. Two men followed, one with a pail of trees, the other with a spade. At each angle a hole was made using the spade as a dibbler. The young seedlings were then inserted and thoroughly tramped about.

Many additions were made to the Arboretum, or plantation of trees and shrubs around the Superintendent's house. The trees, shrubs and bushes were all labeled and marked, so that visitors might easily determine them. In a group together northeast of the Arboretum there were planted several hedges, each sixty feet long and ten feet apart.

One hundred trees of the native White Spruce were obtained from the woods near Sewell, and planted as a hedge for the protection of fruit trees on the hillside ; these are all growing with the exception of two.

Five native Manitoba grape vines were planted in '93 and have made a fine growth. During the past year a considerable number of young fruit bushes have been grown on the farm from cuttings and layers ; also about 60,000 young forest trees and shrubs from cuttings, layers, and seeds. These will be available for distribution.

'96.

The trees in the shelter belt have made a very vigorous growth this season, many of the deciduous sorts are twenty feet high and five inches in diameter, one foot from the ground.

Planting in this belt was commenced in 1889 and completed in 1891. It was kept cultivated with a one-horse "Planet Junior Cultivator" for the first six years; but in 1895 the trees had become dense enough to shade the ground, and it was only necessary to hoe it once by hand.

Last year the ground was shaded so well that the belt was kept free from harmful weeds by a few hours' work. This block has been remarkably free from the depredation of insect pests. It is invaluable as a barrier against the incursion of weeds which might otherwise blow in from the roads to the west of us, and makes also a good wind break.

A large part of our work is that of forest tree distribution, which is much appreciated by settlers living in the open prairie parts of the province. The number of packages sent out last season was larger than in any previous year, viz.: 777 packages containing from fifty to a hundred trees or cuttings in each package.

No less than thirty-seven varieties of trees and shrubs are named as suitable for Manitoba, as hardy and useful for general cultivation. These include as trees Ash, Birch, Basswood, Poplar, Elm, Maple, Oak, Willow, Larch, and Spruce; as shrubs, Caragana, Artemisia, Saskatoon, White Thorn, Lilac, Rose, Currant, Spiraea, Snowball, Honeysuckle, and Native Virginia Creeper.

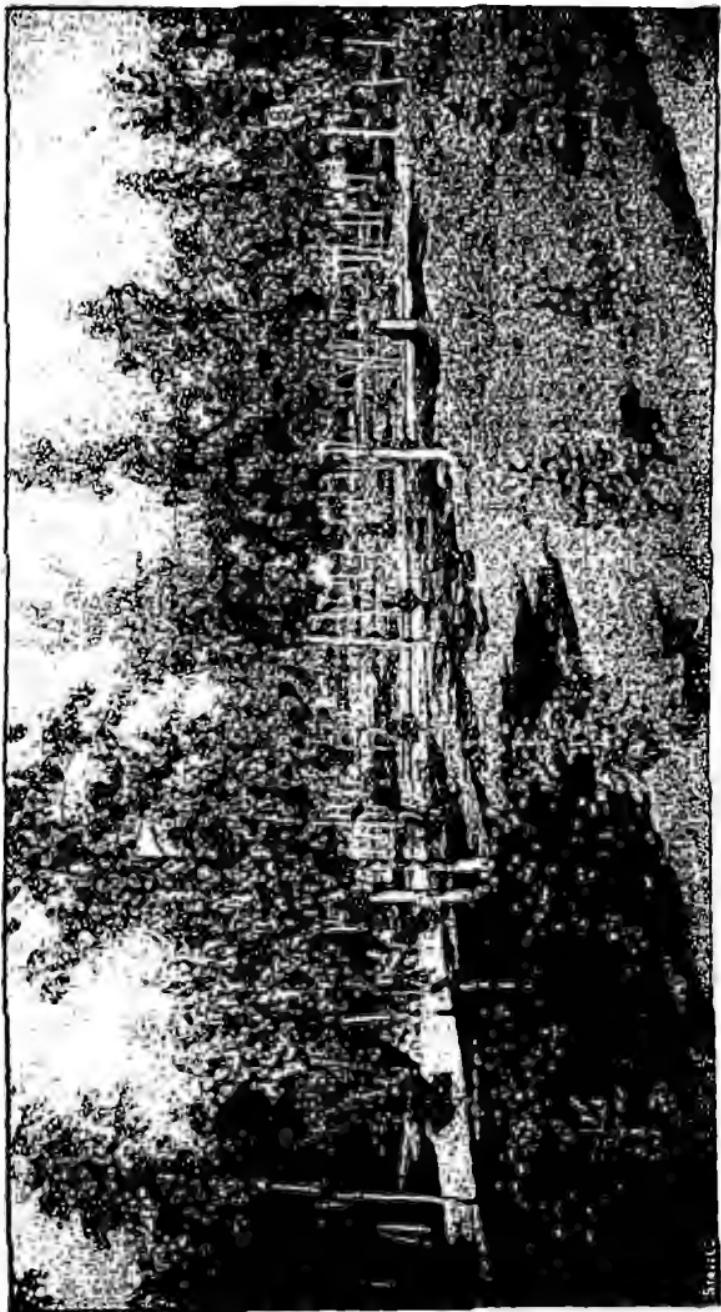
'97.

This has been a testing season. There were late Spring frosts, and dry weather. Notwithstanding this, our plantation of trees and shrubs improves in





SHADY NOOK
(Souris River)—Oxbow, Assiniboin.



ASSINIBOINE PARK,¹¹ WINNIPEG
(Two Years After Photo #1)



appearance every year and each season some objects of beauty are added.

The whole of the Arboretum was sown with grass seed in the Fall of 1896 and has this year formed a fairly good sod; this adds greatly to the beauty of the appearance of the plantation. Circles sufficiently large to allow of root development have been cut in the grass around each specimen, and the surface soil is kept cultivated and free from weeds so as to give favorable conditions for further growth and development.

There is now in this plantation a succession of bloom during the flowering season which makes this part of the farm most interesting and attractive.

In the forest tree shelter-belt work in keeping down weeds by cultivation has been unnecessary for the last two years ; and it is now kept up without expense, except for occasional thinning.

The use and beauty of a well trimmed hedge is becoming more and more acknowledged each season, also the value of untrimmed or partially trimmed hedge enclosures for shelter, and many inquiries are made as to the varieties of trees and shrubs best adapted for these purposes.

Two year old trees should be used in hedges ; those, if kept back for a year or two to encourage a good bottom growth made a very dense and attractive hedge.

The White Spruce, Cottonwood, Ash-leaved Maple, Bercolensis, Poplar, and Sharp-leaved Willow hedges planted in 1890 have made very fine growth and are much admired by the visiting public.

We have had an unusual visitation during the past season from insects of the *Aphis* family, different forms of which have attacked the Maples, Willows, Currants, and other shrubs and trees. The pest was kept in subjection by the use of refuse tobacco soaked in water and the liquid applied with a spray pump.

Reports of the forest tree distribution of '96 are generally good reading, "All shrubs have grown splendidly," "All did well, especially Elm," and the like.

'98.

The trees in the shelter belts and plantations continue to thrive, many of the varieties having made very fine specimens.

In the Spring of 1895 a plantation of one acre in extent was placed near the main road with two year old seedlings of the Ash-leaved Maple and White Elm. The object in undertaking this plot was to find the cost of planting and maintaining half an acre of trees until they were large enough to shade the ground and prevent the further growth of weeds. After four years this plot has reached that stage, and in future will be kept clean with a few hours' work around the edges.

Cost of planting 1-2 an acre—

Growing and digging trees	\$2.50
Cost of planting, 10 hours	1.50
Filling vacancies, 5 hours37 1-2
1st year of cultivating, hoeing, 10 hrs . . .	1.50
2nd yr. of cultivating, hoeing, 7 1-2 hrs. . .	1.12 1-2
3rd yr. of cultivating, hoeing, 5 hrs.75
4th yr. of cultivating, hoeing, 2 1-2 hrs. . .	.37 1-2
Total	\$8.12 1-2

Three kinds of trees have been used for avenue-planting, and up to the present time about three miles of roads have been improved by planting double rows of trees. The Ash-leaved Maple, White Spruce, and *Bereolensis* Poplar have been chiefly used as avenue trees.

In the Spring of 1893, on a rough looking hill-side surrounding the then newly built superintendent's house, the nucleus of an Arboretum was started; a

terraced lawn was graded and laid down to sod, and about one hundred trees, of forty varieties planted; since that time each year new varieties have been added, until at present 1,023 trees of 226 varieties and species are growing. This has changed the aspect of the landscape and given beauty to the surroundings.

'99.

Ten years have passed since beginning the planting of our shelter belt. The growth has now become very dense, and any slight opening has become filled up with a thick growth of native trees. The seed of many of these was evidently brought in by birds. Each Summer hundreds of birds make this their nesting place, enlivening the scene with their showy plumage. It is perhaps owing to the presence of these feathered visitors that we can report almost complete immunity from the many insect pests that too often prey upon trees in Manitoba.

It has been found that many of the Pines and Spruces have been injured from the crowding of faster growing deciduous kinds, and it has now become a struggle between the different varieties, and unless thinned out from time to time, the victory will rest with the most robust and fastest growers.

Evergreens, such as Spruce, Pine, or Cedar, if planted in belts, must be given room, so that they may have the sunlight and air they require for healthy growth.

Many thousands of cuttings of Cottonwood, Poplar, and Willow, have been distributed to the farmers by Mr. Bedford. Experiments as to the best kind of cuttings, show that the mallet or heel cuttings, i. e., those made of a shoot nine inches long, with a heel of older wood about nine inches long. It was found that ninety-five per cent. of these cuttings grew, while a much lower percentage of ordinary straight shoots survived. 4

The following method of planting proved successful : A deep furrow was drawn with the plow, in the manner followed in opening a land ; an assistant with a basket of cuttings (which had been well soaked) inserted the cuttings on one bank of the furrow and covered with moist soil as quickly as possible, a hoe being used for the purpose, followed by a thorough tramping. The mallet system is also recommended for the Honeysuckle and Lilacs.

The importance of hedges is becoming more and more apparent in this country of high winds and hot sun, for they no doubt temper the latter as well as materially break the force of the former. Much interest is taken and many inquiries are made from time to time concerning the best varieties to plant, the manner of planting, clipping ,etc.

We still adhere to the Ash-leaved Maple, Cottonwood and Bereolensis Poplar for tall wind breaks. These, however, are apt to become ragged after seven or eight years.

For a lower or medium hedge the Caragana (Siberian Pea) seems to be all that can be desired, being very hardy, compact and beautiful. It is also useful in bee-pasturage, filling a gap in the flowering season, between the native Poplars and Willows, and the indigenous and cultivated flowers.

For a very low or garden hedge the Asiatic Maple, native Rose, and native Meadow Sweet are all desirable.

Truly the Brandon experimenter has done noble service for tree culture as well as in many other branches of farming.

CHAPTER XI.

ON THE PRAIRIES OF ASSINIBOIA.

Immediately to the west of Manitoba lies the Territory of Assiniboia, a wide expanse of high and dry prairie. Remembering that altitude, soil and quantity of rainfall have much to do with the growth of grains, and field plants, and trees, the Government placed one of its Experimental Stations, at Indian Head, a small town west of Brandon. This farm has been thoroughly successful under the care of Mr. Angus Mackay, and in nothing has its success been more shown than in tree planting. The farm at Indian Head is a marvellous plantation and extends over a wide area of cultivation. Probably it may be most pleasant and profitable to give Mr. Mackay's experience in his own words, but before doing so we insert a letter from Lieut.-Governor Forget, of the Northwest Territories, who has gained an enviable reputation as a successful tree planter. He writes :

Government House, Regina,
28th February, 1901.

Dear Sir :

I am in due receipt of your letter of the 23d instant, and in reply, I have much pleasure in giving you a short account of my personal experience and observation in the matter of tree-culture on our Western prairie. This experience is confined to the Regina District, but extends over a period of 17 years. My first attempt at tree planting was made in the Spring of 1883, on a piece of ground 250x125 feet in connection with my place of residence in the Town of Regina. The trees used were imported from the East and comprised such varieties as were considered best adapted to our climate, such as the Ash, Poplar, and two or three kinds of Willows and Evergreens. The trees were in good condition when received and

every possible care given them at and after transplanting. With a few exceptions they did well and gave good hope of ultimate success, but not one of them showed any sign of life the following Spring. They were at once replaced by native trees taken in the valley of the Wascana. I continued from year to year to increase their number, until the whole ground was covered. It now forms a thick bluff of some 600 trees which rests the eye by its contrast with the surrounding denuded prairie. The trees are all native and in the main of the kind known as the Manitoba Maple, raised partly from seed and partly from two year old plants obtained from the Qu'Appelle Valley, Ash, Birch, Spruce, Willows, and three kinds of Poplar.

"I am now making use of the experience acquired in gradually improving the grounds of Government House. Two years ago this Spring, over 1,000 Manitoba Maple trees were put in and the season being favorable there was practically no loss. Last Spring's work did not prove so successful, owing to the prevailing dry weather. This coming Spring I purpose transplanting the Saskatoon bush. I believe that with proper cultivation the young plant will develop to a shapely little tree, that will prove both ornamental and useful on account of its delicious fruit. The fruit itself will, it is hoped, be larger and more juicy, by cultivation, than that produced by the wild bush.

The secret for successful tree culture lies entirely in ~~properly preparing the ground and in afterwards keeping it in a thorough state of cultivation, free of all weeds.~~ Watering is not necessary.

Yours very truly,

A. E. FORGET,

Lieutenant-Governor N. W. T.

Mr. Mackay, of Indian Head, thus gives his experience:

While, in 1895, the wild fruit crop in Assiniboia

was almost a complete failure, on account of heavy May frosts catching the bushes in full blossom, and though cultivated fruits suffered greatly, only one tree of Buffalo Berry, with its bright red and acid fruits, escaped, yet the season was favorable for forest trees. They rapidly recovered the set back given them in May, and the copious showers of June and July caused them to grow strongly. The new wood had ample time to harden before Winter set in.

In the Spring Manitoba Maple trees were planted on each side of the road running north and south through the centre of the farm for three-quarters of a mile, while two cross avenues of one-quarter of a mile each in length, were set out with Russian Poplars. The southern boundary of the farm was planted for half a mile with Manitoba Maples. With few exceptions all these trees were thriving in the year succeeding their planting.

In taking up and replanting the young trees the following plan was adopted : One deep furrow was plowed alongside the young trees, and the long roots cut by a second furrow, which enabled the men following to gather the trees in armfuls without any difficulty. The roots were carefully protected from sun and wind by being covered with damp earth as soon as they were taken up, and when required for planting were taken out in a tub half filled with thin mud.

In planting, a furrow is made with the plow going twice in the same place as deeply as possible, and the furrows as far apart as necessary. One, two, or three men, according to the length of the furrow, follow, as soon as the furrow is made, and plant the trees by placing the roots in the bottom of the furrow and drawing the earth from both sides with the feet, and tramping it well.

The long tap root on young Maples is cut off before the trees are planted. The armful carried by men is first dipped in water and then well sprinkled

with dry earth to protect the roots from sun and winds, while they are being set out. As soon after planting, as possible, the furrows are filled in by a plow, and the planting is finished.

Jottings from 1896—

In no year have trees and shrubs made more satisfactory progress than in this.

The Manitoba Maples grew so fast that the bark split. No lasting harm was done.

The American Cottonwoods did not ripen well in the previous year, but in this they regained themselves.

Elms and Ashes, though late in starting, pulled up before the season closed.

Avenue trees, and particularly avenue hedges, did extra well.

Out of three miles of the former, and seven miles of the latter, only three trees, and these trees on which the Aphis had done damage, were lost.

Hedges thriving. In the Spring all the shelter hedges were cut back several feet by men standing on wagons and using sickles on long handles. In a single season the loss was made up, and the hedges were improved.

Evergreens—Riga pure did well. Norway Spruce well. Both need to be protected from the winds. Roses last Winter were a failure.

A few words of '97.—

Single trees, hedges and wind breaks all did well.

Among trees transplanted last Spring, losses occurred with the Norway Spruce.

This arose from the planting being done in the second week of May, when the weather was dry and windy. A strong wind storm on 21st and 22nd May, which lasted forty-eight hours, killed all that had not become firmly rooted.

A remark—

In '98 a new plantation, three-quarters of an acre in extent, was set out in the Spring with Maple, Ash, and Elm, and Sand Cherry, which is intended to shade the grounds. Sand Cherry was planted in each alternate row with Maple, Ash, and Elm, in the proportion of two Maples to one of Ash, or Elm, in the other rows. A few Elms died shortly after being set out, but the blanks will be filled up next year.

Only four out of the twelve species of Roses survived, though so full protection, assisted by a snow bank, four deep, was given.

Another year—

During '99 the growth of wood in the forest trees was phenomenal. Maples and Poplars grew between four and five feet in the season. Hedges to be trimmed in other years without trouble, in this year were entirely out of reach.

One of the Russian Poplars (*Populus Bereolensis*) is proving one of the best, if not the best, variety of trees, for avenues and lawns, in the Territories. When all other trees were leafless this Fall, this tree had its entire foliage.

Shrubs set out four years ago as hedges of sharp leaved Willow, Cottonwood, Ginnalian Maple, Caragana, Russian Artemisia, and Manitoba Maple, have proved the most reliable growers.

CHAPTER XII.

ALBERTA PLAINS AND MOUNTAINS.

The world has been greatly advanced by men of strong and fertile minds showing decided tastes and following what it has called "hobbies." Thus we have seen how much Forestry owes to Sir Henri Joly and Mr. D. W. Phips. Another advocate of the claims of Forestry, and also an experimenter in this field, is Mr. William Pearce, Dominion Land Sur-

veyor, of Calgary, Alberta. Calgary is some three thousand feet above Winnipeg, but with great energy Mr. Pearce has surmounted the difficulties of a higher altitude and surrounded his handsome dwelling with his forest trophies. He has kindly consented to tell us of his work :

Calgary, Feb. 21st, 1901.

Dear Sir :

Replying to your postal of the 11th instant, I might state that I had a fair success with the growing of trees at my place in Calgary prior to 1895. Since that date, having plenty of water to irrigate them, I have had most flattering success.

The majority of my trees were placed in their present position about three years ago. They, however, had been growing within a few rods of their present site, having been planted out as small ones about eight or nine years ago, and were transplanted under the most favorable conditions, and although I transplanted several hundred I did not lose one.

As to the kind of trees to plant, I have made this subject a study for a great number of years and the conclusions I have arrived at are that until you can get shelter from winds, it is useless to attempt anything but the natives. The Eastern tree having grown under conditions, particularly as regards winds, so thoroughly different from the conditions experienced with us, the result is almost certain to be a failure. The effect of heavy winds on a tree not accustomed to same is to tear or bruise the fibres so that death ensues. Even some trees which are native to the country will not stand the winds.

In the mountain valleys you will find Jack, Pitch, Princess, or Victoria pines, growing splendidly, but if you will observe, they grow very thick, and where not exposed to the winds. They, apparently, however, will stand any amount of drought as they grow on the highest dry sandy ridges, even where the

precipitation is light. I have tried probably at least five hundred of those and have only four or five growing, and even they are not doing well. The trees that have done well with me are the different branches of the Poplar family, of which we have some five or six varieties. Some of them are very cleanly, handsome trees, of rapid growth, and will live to an age possibly as long as any of the deciduous trees of our country. They may be found growing along the banks of the rivers, and attain often a diameter of from two to four feet.

The Mountain Spruce grows very well with us, and makes a very handsome ornamental tree. The Scotch Fir has also been a success, also Mountain Ash or the Rowan tree. I have tried White Cedar or Arbor Vitæ on four different occasions, and on two of them gave every attention that was possible, and have not been able to succeed. White Pine has also been a failure with me. Canada Balsam I have tried and although it has been a failure, I am not yet convinced, if properly handled, that it would not be a success. I have also tried the Bull Pine, from the neighborhood of Kamloops, B. C. I have not succeeded with it, but still I am of the opinion that if properly handled it would grow.

The Experimental Farm at Indian Head furnished me with a large number of a kind of White Ash. They have been very successful. The growth, however, is not very rapid, at least has not been with me.

The Russian Poplar will grow, and that very rapidly, but experience has shown that it is not advisable to attempt it. Whether from rapid growth or some cause the stem of it is rotten or semi-rotten, the result is when it attains any size the high winds break it off, frequently within a few inches of the ground.

The Ash-leaved, or Manitoba Maple, will grow with us, but is liable to be injured by the Chinook winds. You will observe that the young growth

of this tree consists of thirty or forty per cent. pith. The hot Chinook winds cause this to swell, and also the wood fibre enclosing it, and followed by cold weather, a contraction ensues, in which the bark parts from the wood. As a result, death follows to the part affected. I have seen trees at Pincher Creek which had attained a height of at least eighteen feet, with a very good top, of which seventy-five per cent. were destroyed in one Winter.

It required no great effort to grow trees where they will naturally grow, but take that portion of the Territories in which timber does not naturally grow, and it is only by studying carefully the conditions that trees can be successfully grown.

Another thing which must be borne in mind in tree planting is elevation. I am satisfied that neither Oaks nor Elms will grow in our country at an elevation of much over two thousand feet. I have tried both without success.

As irrigation extends in our country, which it is bound to do to a greater or less extent from this time on, tree planting will grow hand in hand with it, and the probabilities are that within twenty-five years in the irrigated portions of the West we shall have more wind breaks and ornamental plots than the same area in any other portion of the country that may be occupied by settlers.

As to the best time for planting the Cottonwoods, or Poplar varieties, this is just before they come out fully in leaf, from the 15th to the 25th of May. They can be planted to any depth, and it is well to plant them deep, thereby stiffening them against the effect of the winds. Where you have a moist tract, or one which you can irrigate, belts can be very quickly and economically propagated by burying green Poplar poles in the ground, six to twelve inches below the surface, and keeping them thoroughly moistened. Every bud will sprout and in a very short time will

become a nice little tree. They can also be propagated by slips. I have had fair luck with Fall planting of these, but not nearly so good as that in the Spring.

The trees to be planted should be taken from as short a distance as readily procurable, and under conditions as nearly similar as possible. Avoid, if possible, transplanting from a lower to a higher elevation. The reverse condition is not unfavorable.

The Deciduous trees. The most favorable time for transplanting is in June when the buds are well developed. At that stage the tree seems to have more sap in it than at any other portion of the year. The deciduous trees should be planted not more than two or three inches lower in the ground than in the position before transplanting. For a rapid growth the ground should be kept thoroughly clean of grass and weeds, and well cultivated, in this way keeping the surface regularly stirred up. If the ground is not naturally rich, growth will be greatly promoted by enriching it.

I am of the opinion that Forestry, in at least the treeless portions of the Territories, could be best promoted by formation of local Forestry Associations. The experience of all would thus be readily rendered available and whatever experiments were undertaken would be on systematic and intelligent lines. However, beyond everything else for the promotion of tree-planting, I think small local nurseries should be established for the propagation of trees suitable for transplanting, so that they would not require to be moved to any great distance and the conditions would not be materially different from those under which they were grown.

Having at heart the desire to see forestration carried out throughout Manitoba and the Territories, I wish your Society every success, and if at any time I can contribute towards the furthering of its interests I shall be only too happy to do so.

In conclusion, I would urge that the first experiments be confined to trees that you know will grow, and afterwards enlarge the field of your endeavors by trying the more delicate and ornamental Eastern varieties. My experience is that if people are not successful on the first effort it is more difficult to get them to renew their endeavors than it is to start those who have never made a beginning.

Yours very truly,

WM. PEARCE.

A VOICE FROM CARDSTON DISTRICT OF SOUTHERN ALBERTA.

Near the foot of the Rocky Mountains lies the village and settlement of Cardston, founded by settlers from Utah, United States. They have transformed the prairie, and one of their most intelligent young men writes as follows :

Cardston, March 11th, 1901.

Dear Sir :

The many beautiful homes now found in the once sterile states of the West were doubtless an incentive to the first settlers in the Cardston District to likewise improve their surroundings upon the prairies of Alberta. No one factor has a greater part to play in this connection—the beautifying of the home—than the growing of trees. So the pioneers of our village thought, at any rate, for they began their efforts even before the soil had been brought into that state of cultivation which would warrant some measure of success ; they planted trees upon the virgin prairie.

Of course such efforts proved futile, but a year or so of good work brought the soil of the town into better condition ; the trees, which were then planted, began to take root, and through the plentiful rainfall of the first three seasons they lived to encourage the home-builder in his struggles for a competence. But all noticed that the trees made little or no growth and

when a summer of unusual dryness came, the trees showed signs of yielding up their lives in the contest with the sun and the parching west winds.

Then the fact became apparent that more moisture must be had if trees were to be grown successfully, and a small water-ditch—the first in Southern Alberta—diverted a portion of the mountain stream for irrigating the gardens of these industrious, persevering settlers. Only the part of the town in the valley of Lee's Creek, or upon the bottom lands, could be supplied by this first small canal ; however, it was an experiment which proved that trees could be grown successfully if only the necessary moisture was supplied.

Prominent among those who participated in these early attempts to grow trees were Mr. C. O. Card, the founder of Cardston ; Messrs. J. A. Hammer, J. Anderson, M. L. Hinman, G. L. Farrell, J. A. Woolf and J. E. Layne, and of their varying success a few points may now be given.

Mr. Card advised and encouraged all the settlers to plant trees, and by his example showed his good faith in the matter. As did all the others, he first tried the native Poplars, found along Lee's Creek, and though about one-third of those first set out around his town lot, failed to grow, he filled the vacant spaces until irrigation insured the lives of all trees planted. Thus a fine row of shade trees surrounded his town lot on three sides. He next tried the Maple, or Box-Elder, trees, planting the seed. These made rapid growth, but failed to harden sufficiently to stand the freezing and thawing of the mild Winters of Alberta ; so that every year for a number of seasons they killed down, starting again each Spring new shoots from the root. A mistake was made in placing these trees in rows, so that they could not protect each other from the strong winds so prevalent in the Chinook belt.

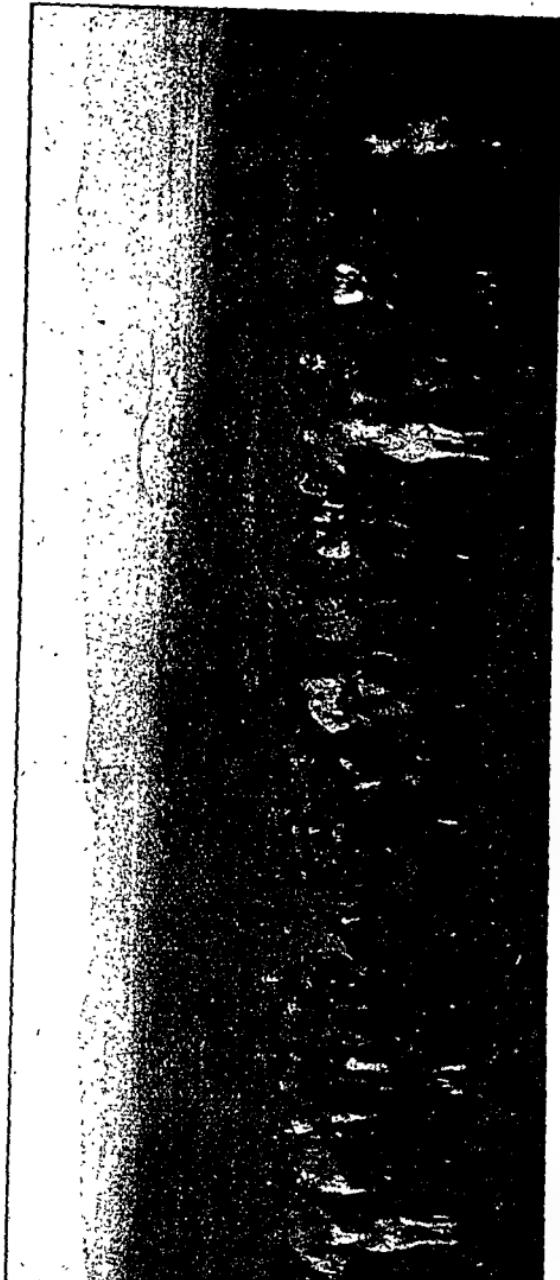
Later they reached a height of ten to twelve feet and made a good wind break.

Ash and Willow also made good growth with Mr. Card when properly irrigated. Though somewhat apart from the subject of Forestry, it might be stated that Currants, Gooseberries, Raspberries, and other small fruits, were grown in abundance after irrigation was had.

Next to the last named gentleman stands Mr. J. A. Hammer, who has been one of the foremost in the irrigation enterprises around Cardston. His first efforts with trees were somewhat discouraging, but after the water was supplied the native trees did so well that he tried fruit trees and succeeded in bringing apple trees to the bearing stage, some apples having been grown last year. These were such a curiosity, however, that every passer-by must see and handle, so that before maturity was reached the apples dropped, or were taken, from the trees.

Mr. Hammer has six hardy apple trees of Russian variety, three of which will in all probability bear next year. The first two Winters, the trees were trenched and afterward mulched with manure every Fall to keep the frost in the ground till the Spring arrived. Last year nearly two feet of new growth was made by the largest tree. Mr. Hammer is very sanguine as to the possibility of growing the hardier fruits, if proper protection be given the trees.

The other parties first referred to had fair success with the native trees, but did little else in the way of tree-culture, with one exception—Mr. J. Anderson. This gentleman is one of the best farmers of the district and has to-day the best showing in the way of trees. He chose a sheltered nook for starting the Maple trees from the seed. These were allowed to grow in a clump rather than in rows. They thus protected each other and grew taller, and straighter, than they would have done otherwise, and in a few



ALBERTA PLAINS
(With Group of Cowboys.)



years were transplanted for shade trees. The native trees, too, have grown remarkably well under his care, and a number may be seen growing, thriftily, as one drives along Cardston's principal thoroughfare.

All the above mentioned, however, are located on the low lands, and where it was possible to irrigate their town plots when necessary. And what of the higher lands? The larger part of the town site, as originally located, is upon the prairie. Here the early settlers tried for a number of years to start the native Poplars, and while the persevering kept them growing for a few years by supplying water from wells, yet to-day I know of none that are alive.

Let no one think, however that this statement indicates such a thing as tree-growing to be impossible upon the open prairies in this locality, for the opinion is held by a large number of practical people that trees may be grown successfully even upon the high lands, provided the soil be properly prepared in the first place, and then given constant cultivation after the trees are planted.

This view has been greatly strengthened by the efforts made at Magrath—a thriving village some twenty-five miles east of Cardston. Here the settlers may irrigate if they choose, as the Canadian Northwest Irrigation Co.'s canal can supply water for thousands of acres and the town was started in connection with this great enterprise. But the results of the experiments in tree-culture, as made thus far, have been very gratifying, and not a foot of land has yet been irrigated.

The peculiar point about their experiments is the fact that the trees, (mostly cuttings and yearlings) have been placed on the sod—the first plowing, and yet to-day they are alive and in good condition promising well for another season's growth. However, the laterals from the large canal have been finished and

this season the trees may be irrigated as often as necessary.

The success attained by the Magrath people in growing trees, or starting them, upon the first plowing, may be due to the soil, which is lighter and more sandy, with much less grass upon it than is found in the vicinity of Cardston. Of course their experiments cannot be looked upon as giving final results either, as the town is only two years old, and last season was a favorable one. A succession of years without irrigation might produce similar results to those arrived at in the Cardston District.

The future of this district holds very bright prospects, as far as tree-culture is concerned. The great irrigation enterprise above referred to places thousands of acres of valuable lands ready for the industrious husbandman to grow anything his heart may desire in the line of cereals, vegetables, hay, trees, or small fruits. By first growing shelter belts of the hardier trees there will be a possibility of growing even the northern varieties of apples and plums, while very large numbers of forest trees may be successfully grown. Information as to the lands of the Irrigation Co. may be had from C. A. Magrath, Lethbridge, Alta.

It now remains for the settlers to turn their attention to this matter of tree-growing. The experiments carried on at the Indian Head Experimental Farm, Assa., show conclusively that we may grow trees successfully in this district, where conditions are even more favorable and where irrigation is now possible over an extended area.

Yours truly,

S. W.

THE GREAT IRRIGATION PLAINS.

But not only is the Cardston district being made fertile by utilizing the streams flowing down the Foot-

hills from the Rocky Mountains, but this Canadian Piedmont farther north is being largely developed in the same way. Under the fostering care of the Government the Calgary Irrigation Company, and the Sheep Creek Irrigation Company, have done much to water the land about Calgary and Okotoks, while Wallace's Ditch, near High River, Quorn Ranch Irrigation Ditch, MacMillan's Ditch, Bevan and Ricardo's Ditch, Hull's and Maloney's Ditches, all in the region south of Calgary, speak of great individual enterprise. Still greater things for the district are in prospect.

In regions east of Alberta also, on the prairie rivers and streams—Qu'Appelle river, Wascana, and Moose Jaw creeks, and elsewhere, Government surveys are made, and drains and reservoirs projected, and the provision promised of an abundant supply of water.

Two things the irrigation scheme favor :

1. The preservation of all forests at the head waters of the streams depended on for the irrigating water supply is essential. It will be to the interests of all concerned to watch over the timber reserves and preserve them.

2. The distribution of irrigating canals all through the region will result in a prolific growth of trees, which will tend largely to retain the moisture in the whole district once known as arid.

CHAPTER XIII.

THE BEAUTIFUL SASKATCHEWAN.

The North Saskatchewan country has always been famed for its beauty. It is the beginning of the Great Forest region of the Canadian West. Accordingly tree planting is not so pressing and important there as it is upon the open plains. The great problem for the settlers and the Government in the Prince Albert and Edmonton regions will be the preservation of the valuable forests. Mr. R. S. Cook of Prince Albert, and Mr. R. A. Ruttan, of Edmonton, describe this great region.

Prince Albert, 4th March, 1901.

Dear Sir :—

In reply to yours of the 23rd ult., re tree planting at Prince Albert; I beg to say that outside of the Town of Prince Albert very little has been done along the above lines, as Nature has abundantly supplied by far the greater portion of the immense district of Saskatchewan with good timber; in fact at no very distant date the whole country must have been heavily timbered, and tree planting, except for ornamental purposes, is not a necessity.

I may also say that we are, owing to the vast stretches of timber lands, free from the devastating winds which sweep the plain country to the south of us. Farmers are not troubled with soil drifting, and hot winds and shelter belts are not required to protect the crops. The temperature is more equable and the rain fall much greater owing to the same cause.

I have planted a good many trees for ornamental purposes and with good results. The following is a list, in order of merit :

Balm of Gilead.—For avenues, and where a nice symmetrical tree is wanted to stand out in an open

space, is without rival in this country. For avenues cultivate thoroughly a strip of land 8 to 10 feet in width, and plant Balm 20 feet apart with native Spruce (taken from the high land) in between ; keep the ground cultivated four or five years, then seed to grass. I find the best time to move the Balm is when the buds are opening, and the Spruce any time in May or up to 15th June. Great care must be exercised in transplanting the latter, not to disturb the rootlets or let the air at them. My losses have not exceeded 5 per cent. I select a nice tree 6 to 8 feet in height standing alone on the upland ; take a sharp spade, and cut all round the tree, about 18 inches from the stem, and remove the tree without disturbing the earth. If by any chance the earth falls off, throw the tree away and try again. If I plant a dozen trees I expect at least eleven to live, and go right ahead and grow, and not remain the same size for a few years.

2. *Russian Poplar*.—About the same as the Balm.

3. *Manitoba Elm*.—For river bottoms of sandy nature this is the tree above all others, and is perfectly hardy here.

4. *Native White Birch*.—For ornamental trees for lawns, I know of nothing that can be grown in this country prettier ; it is an easy tree to transplant, and is a rapid grower.

5. *White Poplar*.—For groves, a very handsome grove can be attained by planting trees six feet apart and cultivating in between them.

6. *Dakota Cottonwood*.—Coarse tree of very rapid growth.

7. *Native Manitoba Maple*.—Makes a nice shade tree, but is often killed by the *Aphis*.

8. *Native Jack Pine* (*Banksian Pine*).—This tree grows in sand, but will stand transplanting to a

more generous soil ; if treated the same as the Spruce above, is a very rapid grower, and planted in groves they give a very nice appearance to a large lawn. I have moved trees 18 to 20 feet in height in Winter by taking the earth with the tree ; two men with a team will transplant four trees a day and if carefully done three trees out of the four will live.

Manitoba Oak.—Have one nice little tree of which I am very proud. It stands the Winters all right and last season made good growth and although my experience has been confined to this one tree I believe the Oak will be a valuable addition.

Black Birch.—Not equal to the White.

Green Ash.—Only half hardy, with me; is found at Saskatoon in the ravines and river banks.

Mountain Ash.—Not hardy.

Hedges.—The Native Spruce treated as above will in a few years make a very beautiful hedge.

Caragana.—Perfectly hardy, and very handsome in Summer.

Ornamental shrubs, Tartarian Honeysuckle, Caragana and Lilacs are all hardy.

I am, yours very truly,

R. S. COX.

Edmonton, 1st March, 1901.

My Dear Sir :—

I have this morning your letter of the 23rd ultimo.

The subject of Tree Planting has not as yet engaged any serious attention in this district. As you are well aware, the whole region north of the 52nd. deg. is fairly well forested with the Poplar family, Spruce and Birch. The Poplar is abundant everywhere. With us, therefore, the problem has been less forestration

than preservation. Opinion on the latter phase of this important matter is fast becoming unanimous as to the means of protection, although but little has been, so far, accomplished. There is, however, a general agreement that the best means to employ consists in opening up the roads and keeping them free from inflammable material. By a common resort to this plan of operations the numerous prairie fires (which can never be prevented) could be arrested with facility and confined to limited areas. At present, in every part of the region, it is necessary merely to fence any area against the encroachment of cattle, and safeguard it against fire to encourage the rapid growth of Poplar forests. Even in localities where the original forest has been destroyed and the vegetable mould burnt off to a depth of two or three inches the regeneration of the Poplar occurs in a truly remarkable effort of Nature which I have not yet had adequately explained.

A feeble effort has been made here in Edmonton, from time to time, to grow the Eastern Apples, but, so far, without success. I have been informed that it is our high altitude (2,500 feet), and not peculiarities of temperature or rain fall, which operates to preclude success in this line. There is an abundance of wild fruit, Cherries, Plums, Cranberries—High and Low Bush—Currants, Gooseberries, etc.—so that (I am assured) we may hope, some day, by grafts and acclimatisation, to bring all the members of the hardier fruits to some degree of perfection.

For ornamental trees we appear to prefer our Native Spruce and Birch, with Thorn, Cherry, etc., to any foreign varieties. The two former trees, properly disposed for landscape effects, give an excellent result. I am writing you without a really intelligent idea of the kind of information which you may wish to have concerning this region; but think it well to do so in order that you may have my reply by the date

mentioned in your letter. I regret that it does not appear to be practicable to afford particulars which are likely to be of any value to you. If, however, you conceive it possible that I can collect facts which might be of assistance in the important subject of your enquiry, I shall be pleased to do my best to furnish them upon hearing from you again.

There is a good deal to be said on plans for conservation, on the subject of encouraging new forest growths, for domestic and industrial purposes, upon the laying out and management of reservations of timber, etc.; all matters which have engaged the attention of officers of the Interior Department for many years, but I doubt if they would fall naturally within the scope of your present enquiry.

I am, My Dear Sir, Yours very truly,

R. A. RUTTAN.

CHAPTER XIV.

HOW TO USE ARBOR DAY.

United effort is surely needed if the broad plains of Manitoba and the Territories are to be covered with forest trees. Governments cannot cover the whole country unless the people,—men and women, boys and girls,—do their share. In several parts of our continent when the tree planting time comes in May, the Government sets apart a day so that in that month families, business men, children, and the whole people may each be freed from business, study or work, and be given time to plant a tree.

MAY, 1901.

What can be done this year? It will not do to plant a tree in the sod in the lawn, or garden, or plot of ground we may happen to have for our use. The

ground needs to be prepared this year for planting next year. Let every farmer in the country and every one that has a lot in town see to it, that he plows on Arbor Day, or near that time, a plot of ground for trees. This should be a strip like an L on the North and West side of the house or building to be protected—and every house needs this protection from the wind. Do not put the strip within fifty feet of the house lest the snow may be an annoyance to the house in Winter.

Stake out a strip ten yards wide, and if you can plant two hundred trees this will need to be twenty-five yards long. That will allow you to plant the seedlings four feet apart—a convenient distance for the cultivator to pass both ways between the trees. On Arbor Day of this year do not fail to see that this land thus laid out is broken, if it is sod, by good plowing three inches deep, and then well rolled to flatten the sod. For months the sod may lie and rot. Then it should be backset by being plowed from five to seven inches deep. Now, too much labor cannot be put upon this plot in the first year. Harrow ! Harrow ! Harrow ! Every weed should be kept down. The soil should be thoroughly pulverized, and in the Autumn it will be in fine condition.

Perhaps some farmer may say, "This is too much trouble. Such pains are unnecessary, or as William Silvering would have said, 'They didn't take that trouble down in "glorious old Norfolk." Well, in Manitoba and the Territories, we answer, if trees are to be grown this amount of work is needed, as the experience of all those given in different parts of the Canadian West has clearly shown. "No pains ! No gains !"

IN THE SCHOOLS.

This is a great matter for the schools. The Government sets apart a day in May in which "Arbor Day" is to be kept. On this day preparations are

made for planting trees on the school grounds. In this year, 1901, unless ground has been previously prepared nothing but the plowing can be done. But this should be attended to this year. How? Teacher and scholars should, with the trustees, choose a strip of ground on the North and West of the school plot, as wide up to ten yards as the lot will allow, keeping at least fifty feet between the edge of the plot and the school house. It should be made a matter of importance.

Teacher and scholars should have induced the trustees to have a sturdy young settler and his horses and plow engaged to be on the ground at eleven o'clock to begin the work under their guidance of plowing the plot selected. This matter arranged, then an hour or more might be spent between 9 and 11 in Arbor Day exercises. A poem or two before this committed to memory, will be found very interesting to the scholars and their parents. The book, "Our Canadian Prairies," sold at a low price in any of the bookstores in Manitoba, and authorized by the Advisory Board, contains from page 98 to page 139, many interesting dialogues, poems, addresses, and pretty sentences on Arbor Day which will make a very interesting entertainment indeed. When these are over and perhaps a short address or two made by the trustees, the ceremony should be begun, by placing little "Union Jacks" at the corners of the plot, and getting the outside furrows plowed in the presence of the scholars and their teacher and friends. Some game or other entertainment may be held on the ground if the weather is fine; and the ceremony brought to a close by all joining heartily in singing, "God Save the King."

The plowing may then be completed. Teacher and scholar should then see that the backsetting takes place in July, and keep the trustees in constant mind,

when cultivation of the plot is necessary to subdue the weeds.

MAY, 1902.

Another year has passed, Arbor Day has come again. The plots so well cultivated are now ready for receiving the trees. During last Summer the plots should have been fenced in some secure way that unruly cattle, or pigs, may not have found their way to the future wind break. A fence should be erected about the plot before a single tree has been planted. When March 1902, comes, then the teacher or one of the trustees should have sent away to Mr. S. A. Bedford, Experimental Farm, Brandon, or to Mr. Angus Mackay, Experimental Farm, Indian Head, to ask him for the number of trees required for planting the plot. These gentlemen are very kind and obliging men, as well as being very earnestly in favor of tree planting. They will certainly send the little seedlings if application before the end of March is made to them. They are agents of the Government and both the Dominion and Local Governments are very anxious to advance tree planting.

IN THE SCHOOLS.

May, 1902, also brings Arbor Day to the schools. The plot, we assume is now ready; it, we suppose, is fenced in; and the teacher by writing away in March to Mr. Bedford, of Brandon, or Mr. Mackay, of Indian Head, has obtained the number of trees he requires for the school plot. When the package of seedlings arrives in April or early in May, it should be carefully put away in a cool place until the time comes for planting.

Arbor Day should again be observed for an hour or two in the morning by the scholars in repeating poems learned, or dialogues, or the like, and then going out to plant.

PLANTING.

The exercises all over, then the bundle of trees is opened out and prepared. The ground shortly before Arbor Day should have been plowed eight or ten inches deep and harrowed fine, and in the forenoon of Arbor Day marked by a horse drawing a four-foot marker both ways over the prepared ground. The ground is thus divided into squares four feet each way.

All ready, three or four of the larger boys, each armed with a spade, should make deep holes. Each child, even the very youngest, should plant a tree. In the deep hole behind the spade the planter places the tree, pretty deep, that is, two or three inches deeper than the seedling was grown. When the trees are all planted then the closing exercises should be held, just as was done in 1901. Should Arbor Day be wet, the planting should be put off and a day selected in the week following. Farmers and tree planters in cities and towns might take a few hours at tree planting in the week immediately after Arbor Day.

CULTIVATING.

The work is not, however, at all completed when the planting is finished. The plot where the trees are planted is to be cultivated thoroughly and often, to keep the ground clean and mellow. The experience of all those we have quoted in every part of Manitoba and the Territories shows that this should be done for from four to seven times each year for four years, after which time the trees by their shade prevent the growth of weeds, and save further work. The trees should not be trimmed until after they shade each other and the ground, sufficiently to smother the weeds.

By such means as this, we hope to see the time when the wisdom and industry of our people will make Manitoba and the Territories a land of forest

trees. Let us devote every energy to accomplish this, that we may join in a hearty forest song :

A song for the beautiful trees,
A song for the forest ground—
The garden of God's own land,
The pride of His centuries."

CHAPTER XIV.

THE NEW PROJECT.

The experience afforded by the Experimental Farms of tree planting for some twelve years, the success of many private persons in growing wind breaks and avenues, and the greater attention shown to this subject by the Government in their appointing a Dominion Director of Forestry, have now led to what may be called a forward movement in the great matter of tree planting. Good methods followed in the past have not been ignored or forgotten, but the outlook now is toward a regular system of advancing forestry in Manitoba and the Northwest Territories.

What is this ? The policy may be said to divide itself into four parts. These are :

1. *Reservation.* While there are said to be one-quarter of a million of square miles of prairie there are more than a full million of square miles of lands more or less thickly wooded. This is not the general notion, but it is true nevertheless. North of the Saskatchewan river are great forests, while here and there there are ridges, or low lying lands, or river banks or sheltered plains where trees are growing abundantly. The policy of the Dominion Government for fifteen years has been to preserve these forests on the following reserves :

1. Riding Mountain Reserve.
2. Turtle Mountain Reserve.
3. Assiniboine Reserve.
4. Moose Mountain Reserve.
5. Cypress Hills Reserve.
6. Foothills of Rocky Mountains.
7. Banff National Park.

Not only is setting these apart as reserves a wise and necessary thing, but the steps taken to preserve them are important. They are to be protected from two evils : 1. Dishonest trespassers ; 2. Forest and prairie fires. Government agents are wisely allowed to give permits to the settlers to cut wood under restrictions. These rules should be strictly observed. The whole of the intelligent and right-minded community will say : "The forests are our public inheritance, they must be preserved and all stealing and dishonesty shall be frowned down and crushed out. The lawless, reckless spirit sometimes shown should be stamped out by sound public opinion and by the strong hand of the law."

The other evil, that of fires, has been a good deal minimized by the appointment of fire guardians, who in the pay of the Government, make it their duty to scour the woods, watch against fire, remind travellers of the law against lighting fires at their camping places, and carrying out the provisions of the laws by bringing flagrant offenders before the magistrates.

All reports in regard to the system of fire guardians in the different provinces seem to agree in recognizing their value.

2. *Co-operation.* A great difference exists between Canada and the European countries where forestry is carried on. In these old world countries it is purely a Government affair. The Government provides a large staff as we have seen, makes a civil service of these, uniforms them in the same way as let-

ter carriers or police. This may do where arbitrary Governments hold sway, but will not meet the views of our more flexible popular government.

Accordingly our Government proposes to co-operate with and assist settlers and other tree planters, thus appealing to their private interest and help. It is proposed that any land holder desiring to plant trees shall apply to the supervisor of his district; when this agent shall have been appointed by the Government, and obtain a visit from him to set a-going the machinery required for tree planting.

3. *Instruction.* We have seen it to be the opinion iterated and reiterated by every tree planter that it requires care and skill and energy to grow trees upon the prairies, and that it is easy to make mistakes, and thus to labor for naught. The plan of instruction proposed is that when the co-operation of the Government is sought,

1. The supervisor will visit the farm, make a plan of the farm, and lay out the plot wisely.
2. He will give directions for the preparation of the soil, viz., (to plow the plot this Spring, 1901.)
3. The supervisor will give directions for cultivating all through the Summer.
4. He will endeavor to see the plowing begun before his visit is over.
5. The supervisor will endeavor to create interest in the neighborhood by forming a Forestry Circle, by getting men of the William Silvering type worked into line, and by inducing schools, private persons, villagers and townspeople, as well as farmers, to observe Arbor Day and take steps to prepare the ground this year (1901.)

4. *Inspection.* During this first season the supervisor will visit the plots being prepared, see that they are being backset in July and after that cultivated and harrowed, so that the weeds are kept down absolutely. This visit of an expert and popular man will meet the

chief obstacle of tree planting on the prairies, i. e. : *neglect after the enthusiasm of the first steps has passed away.*

1902. The supervisor will have a busy season in (1902).

1. He will, in March, undertake to supply from the nursery or experimental farm, free of cost, the proper seedlings for the plots fully ready.

2. He will point out the method of planting —the *where* and *how* and *when*! This will be his duty.

3. He will re-visit during the Summer and see that the cultivating is going on. Failure to carry out his instructions will lead to a ceasing of his visits.

4. He will claim the right when the plantation has become a few years old to take such spare seedlings as may be necessary to supply other settlers. This seems perfectly just.

5. During this year new ground should be broken and the line of action of 1901 taken so that in the following year of 1902 a new plot may be planted and the plan advanced. All friends of tree planting will feel the need of keeping up meetings of the ~~For~~ estry Circles that may be formed, of making them practical and interesting by getting Forestry literature, having lectures by the supervisor or others, and of inducing the people to take a pride in seeing who can make the greatest success of the planting.

There will be, we may be sure, many Bowerbanks in the Canadian West ; William Silvering will not be derided in three or four years as having a bare and bleak homestead, but will be a leader in the competition ; it is becoming more and more evident that Minister Brown and Miss Louis Silvering will combine their forces in cultivating the same forest and garden plot, and the hope is confidently expressed that the prairie may with tree and shrub, and flower, and fruit, become a well watered garden.



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